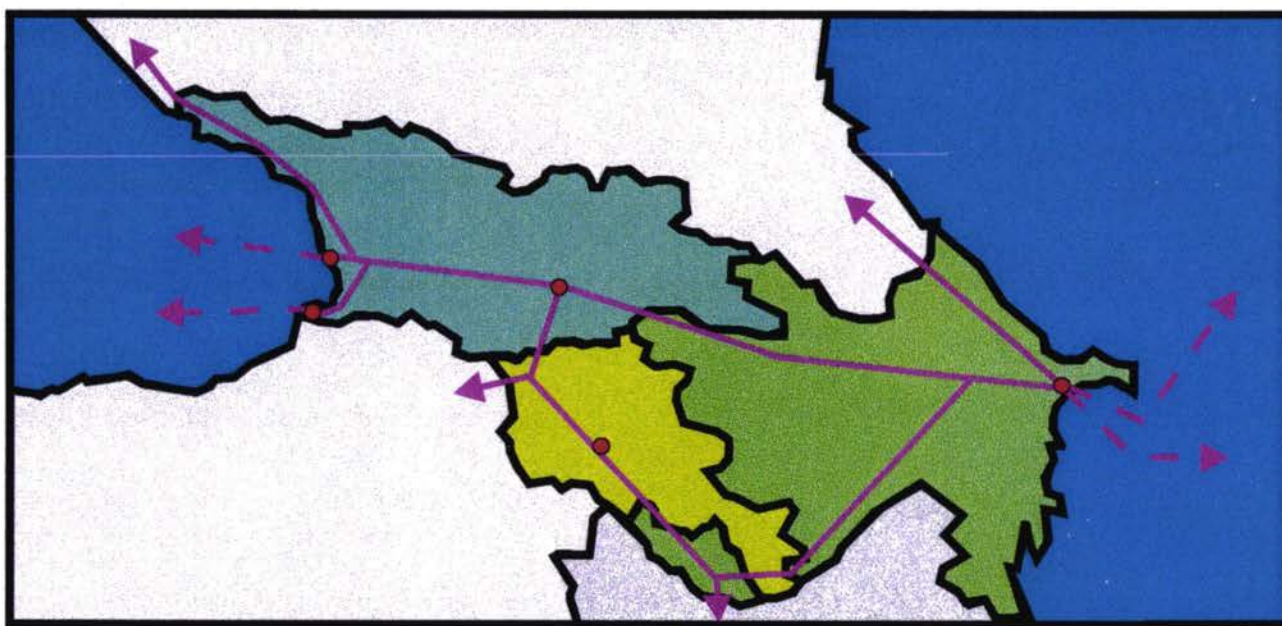


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for the
Caucasian Railways**



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Abbreviation list:

AC	Alternating Current of electrical power
AGC	European Agreement on Main International Railway Lines
AGTC	European Agreement on Important International Combined Transport Lines and Related Installations
AGZD	Azerbaijan State Railways
AICCF	International Railway Congress Association
AIM	Agreements for the International Carriage of Goods
AIOC	Azerbaijan International Operating Company (Oil production)
AIV	Agreements for the International Carriage of Passengers and Luggage
ARM	Agreement for the Communication of Traffic Restrictions for the International Carriage of Goods by Rail
ARM	Armenian Railway
ATP	Agreement on the international carriage of perishable foodstuffs and on the special equipment to be used for such carriage
BIS	Baku International Seaport
BOLT	Build - Operate - Lease - Transfer
BOT	Build - Operate - Transfer
BUS	Transformer station of railway power supply
BWRS	Baku Wagon Repair Plant
CECA	European Community for coal and steel
CEH	European Timetable Conference for Passenger Trains
CEM	European Timetable Conference for Goods Trains
CEV	European Passenger Tariffs Conference
CFS	Container Freight Station
CIM	Contracts for International Carriage of Goods by Rail
CIS	Commonwealth of Independent States
CIT	International Rail Transport Committee
CIV	Contracts for International Carriage of Passengers by Rail
COTIF	Convention for the International Carriage by Rail
CSC	Caspian Shipping Company
DB AG	Deutsche Bahn AG (German Railways)
DC	Direct current of electrical power
DCU	Uniform Regulations for Rail Transport
DEG	Deutsche Investitions- und Entwicklungsgesellschaft mbH (German Society for Investment and Development Ltd.), Cologne, Germany
DEM	Deutsche Mark (= German currency)
DIN	German Regulations of Standardisation in the Industry
DM	Deutsche Mark (= German currency)
DMU	Diesel Motor Unit
Dpt.	Department
DR	type of inspections of locomotives, wagons, coaches and EMU/DMU
DSA	European Prestressed Concrete Sleepers (type of sleepers)
DSS	Decision Support System
EBRD	European Bank for Reconstruction and Development, London, UK

EC	European Community
ECE	Economic Commission of the UN for Europe
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration Commerce and Transport
EDP	Electronic Data Processing
EEC	European Economic Community
EMU	Electric Multiple Unit
ESCAP	Economic and Social Commission for Asia and the Pacific
EUROP	Agreement for the Common use of Wagons
FADA	Traffic controller installations
FESA	Permanent line-side radio installations
FSU	Former Soviet Union
FTOS	Freight Transport Operation System
FZ	Financial co-operation programme (in Germany)
GDP	Gross Domestic Product
GDR	former German Democratic Republic
GOST	State Organisation of Standardisation of the former Soviet Union
GRID®	American management training system
GRZD	Georgian Railways
HERMES	German State Guarantees for Suppliers
HQ	Headquarters
HV	High Voltage
ICC	Information and Computer Centre
ICE	Inter-City-Express(-Train)
IMF	International Monetary Found
IRR	Internal Rates of Return (of investments)
ISO	International Organisation of Standardisation
JV	Joint Venture
KfW	Kreditanstalt für Wiederaufbau (= German Bank for Reconstruction), Frankfurt/Main, Germany
KR	type of repairs of locomotives, wagons, coaches and EMU/DMU
LIF	General List of Frontier Points for Rail Transport
LOI	Letter of Interest
LOU	Letter of Understanding
LV	Low Voltage
MBC	Motorised coaches
MESA	Mobile railway radio installations
MIS	Management Information System
MPS	Ministry of Railway Transport of the former Soviet Union
MTT	Uniform Transit Tariff of the OSShD
MV	Medium Voltage
nm	nautical miles
OCC	Operations Control Centre (of the railways)
OCS	Overheadline catenary system of power supply
OCTI	Central Office for International Carriage by Rail (in Bern, Switzerland)
OR	type of overhauls of wagons, coaches and EMU
OSShD	Organisation for the Co-operation of Railways
PC	Personal Computer

PCM	Personal Computer assisted Management
PFCCS	Processing and Freight Cost Calculation System
PIEx	Common Regulations for the International Carriage of Express Parcels
PIM	Common Regulations for the International Carriage of Goods
PIV	Common Regulations for the International Carriage of Passengers and Luggage
Pkm	Passenger-kilometre
POD	Port of Discharge
POL	Port of Loading
PPW	Regulation for the Use of Wagons in International Rail Transport
resp.	respective
RIC	Regulations for the International Carriage of Containers by Rail
RIC	Regulations for the Reciprocal use of railway carriages and luggage vans for International Transport
RID	Regulations for the International Carriage of Dangerous Goods by Rail
RIEx	Regulations for the International Carriage of Express Parcels by Rail
RIP	Regulations for the International Carriage of Private Wagons by Rail
RIV	Regulations for the Reciprocal use of Wagons for International Transport
RoRo	Roll-on-Roll-off
RSM	General Summary of Special Regulations for the International Goods Traffic
SBB	Swiss Federal Railway
SCADA	Supervisory, Control and Data Acquisition System
SMGS	Conventions to International Railway Transport of Goods
SMPS	Conventions to International Railway Transport of Passengers
SNCB	Belgian Rail
SNCF	French National Railway Society
SZD	former Soviet Railways
TCLE	Trans-Caucasian-Logistic-Express
TECF	Tbilisi Electro-Locomotive Construction Factory
TEU	Twenty feet container Equivalent Unit
TEWRS	Tbilisi Electro-Wagon Repair Plant
TEWS	Tbilisi Electro-Wagon Repair Plant
TIEx	Agreements for the International Carriage of Express Parcels
Tkm	Ton-kilometre
TO	type of overhauls of locomotives, wagons, coaches and EMU/DMU
TQM	Total Quality Management
TR	type of repairs of locomotives, wagons, coaches and EMU/DMU
UIC	International Union of Railways
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UTI	International Transportation Units
VAT	Value Added Tax
ZÜV	System for the supervision of train running

Chapter 6

Development of Joint Ventures

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6.1 Present conditions and market analysis

6.1.0 Introduction

A quantitative analysis of freight and passenger traffic and the projected traffic level for the railways involved are described in detail in Chapter 3. Therefore, the analysis of the present freight transport conditions and the freight market analysis focus on the current organisation, effectiveness and deficiencies. Based on this analysis, general recommendations for increasing revenues and reducing costs are given. The objectives and the strategy in order to improve performance and efficiency are defined.

The analysis summarising the present conditions of passenger transport and the passenger market is aimed at assessing the future role of passenger transport within the railways and the transport market. New services in order to improve performance and efficiency and to increase the market share are prepared. In addition, general recommendations for increasing the viability of passenger services are given.

Proposals for marketing concepts to be introduced in freight and passenger transport are also presented.

The analysis of rolling stock (wagons and coaches) and locomotives including their availability and maintenance condition (see section 1.6) has been taken into account. Generally, passenger and freight services are not hindered by the size of rolling stock, but rather by their condition and reliability. The availability of rolling stock will be sufficient when the excessive demand due to high journey times and frequent locomotive changes can be reduced. For the most part of the rolling stock, periodic maintenance and general overhaul are overdue.

There are considerable deficits in the area of marketing. Customers are rarely approached on the railways' own initiative and the railways lack active and hard-hitting acquisition in most cases. The centrally planned and organised procedure, which is very time-consuming, is still in use and the local railway authorities are not given any competence. There is the objective necessity of co-operating closely and of introducing new management and marketing mechanisms in order to improve the situation of the three railways in the short term and to stabilise it thoroughly in the medium or long term.

In addition, **general** recommendations for action in order to increase revenues and to decrease costs are presented in this chapter. These recommendations include both freight and passenger services. It must be clearly pointed out that these general recommendations have to be adapted to the special conditions of each of the Caucasian railways.

6.1.1 Present conditions on freight transport

6.1.1.1 Armenian Railway (ARM)

Since 1989, the transport performance of 5,121 million net-tonne-km declined to 351 million net-tonne-km in 1996, that means to 6.9 %. However, the number of employees involved in the main types of railway activities decreased from some 16,000 in 1988 to still 4,686 in 1997.

The main causes for the extreme drop in freight transport are explained in detail in section 3.1.5.

Freight as well as passenger transport are seriously hindered by the interruption of the railway connections to Russia, Iran and Turkey. The only working border crossing is with Georgia. As a consequence, the proportion of exports in total rail freight traffic decreased from 23.7 % in 1989 to 11.2 % in 1996. Nevertheless, the railway is still an important mode of transport in Armenia and is also significant for strategic purposes. The railway transports more than 50 per cent of the goods in international traffic (oil, cereal, wood, flour, metal concentrates, metals, spare parts, equipment, construction materials, consumer goods and others).

In the environment of market economy transition, railway transport is still competitive against road transport because of the following reasons:

- fuel shortage and the demand for imports into the republic
- lack of high-capacity trucks (more than 10 tonnes)
- higher charges for road transport compared to transport by rail
- the majority of industrial plants are located near the railway lines
- existence of widespread industrial branch lines (private sidings)

Table 6.1.1-1: Freight traffic - ARM

Year	received		forwarded		million net-tonne-km
	'000 wagons	'000 tonnes	'000 wagons	'000 tonnes	
1985	....	22,957.0	....	19,243.6	5,140.0
1988	....	21,663.8	....	18,054.4	4,803.1
1989	....	25,835.0	....	15,640.8	5,120.5
1990	....	22,910.0	...	14,691.9	....
1991	320.5	17,332.8	199.2	11,803.5	...
1992	87.8	4,919.7	45.1	2,547.6	....
1993	28.3	1,553.2	17.6	1,056.3	....
1994	22.1	1,193.3	12.6	769.6	377.6
1995	22.7	1,421.4	13.8	832.3	425.9
1996	....	1,044.7	...	666.0	351.0

There are no major seasonal traffic variations over the year. Traffic peaks do occur however during the summer time when the weather conditions are better and harvesting is in full swing.

According to the information provided by the freight department of ARM in December 1996, the major commodities for the year were oil and oil products (20 %), grain and cereal products (55 %), cement (10 %) and foodstuffs (10 %). In 1989, 53.8 % of the whole transport volume was made up of imports. In 1996, this share was still 43.4 %. 46.1 % of the commodities imported by rail in 1996 were oil products; 25.4 % grain and foodstuff. Due to the reasons mentioned above, the share of exports in the whole transport volume decreased from 23.7 % in 1989 to 11.2 % in 1996. Transit traffic has never played an important role for the Armenian Railway. In 1989, only 40,000 tonnes of transit goods were handled.

In 1995, loading increased by 10.8 % as compared with 1994; unloading and transport performance (net-tonne-km) by 11.9 % each. However, in 1996, freight volume transported by rail and consequently transport performance decreased again. This was partly due to the reduced international humanitarian aid. Nevertheless, freight transport is still the backbone of the Railway of Armenia, representing approximately 95 % of the revenues earned.

The main freight stations are Vanadzor, Gyumri, Masis, Ararat, Karmir Blur, Yerevan, Charentsavan and Razdan. Freight transport is not hindered by the extent of the facilities, but rather by their condition (see section 1.4.1 and Annex 1.4-1). Annex 1.4-1 also contains the number of forwarded and received wagons in 1995 and 1996 as well as the volume of forwarded freight traffic (tonnes) in 1995/1996 for the main stations selected.

For some years, only a small number of freight trains has been running; on average, five to eight trains per day. Some trains are formed at the loading yards, for instance Ararat, Karmir Blur, Yerevan, Charentsavan, Razdan and Sotk. The capacity of the

Masis marshalling yard has only been used to a very limited extent since the beginning of the 1990's.

The turnaround time of a wagon has been reduced in the course of recent years and amounted to 30.8 days in 1996.

Freight transport is also suffering from the absence of any marketing. The "co-operation" with the customers follows more or less the Soviet era rules (*"We are waiting for the clients."*) and is severely hindered by the inadequately functioning communications system. Only the first steps towards reorganisation and market orientation have been initiated since 1995.

Container traffic

In 1996, the Armenian Railway received 1,184 loaded 20' and 201 loaded 40' containers. 316 loaded 20' and 11 loaded 40' containers were forwarded. This underlines the unbalanced character of the traffic. The number of containers handled by each of the existing terminals is presented in Annexes 1.5-1 to 1.5-4. The main commodity received is foodstuffs; the main commodities forwarded are cables, chemical products, non-ferrous scrap metal and machine tools.

Table 6.1.1-2: Container traffic in 1996 - ARM

Month	forwarded				received			
	20'		40'		20'		40'	
	empty	loaded	empty	loaded	empty	loaded	empty	loaded
January	137	16	34	-	7	123	-	46
February	80	5	53	-	1	88	-	51
March	42	15	-	-	-	17	-	5
April	93	1	12	-	-	287	-	12
May	121	50	-	-	-	39	-	2
June	17	19	8	3	-	25	-	9
July	21	36	1	2	-	36	-	3
August	20	32	4	1	6	107	-	8
September	91	21	5	-	-	268	-	4
October	90	56	14	-	15	33	-	13
November	15	39	8	2	4	91	-	27
December	24	36	29	3	6	70	-	21
total	751	316	168	11	39	1184	-	201

As can be seen in Annex 1.5-3, in 1990 the container terminal Karmir Blur received 12,518 TEU (20' and 40' containers). Therefore, there is no doubt that this terminal after rehabilitation will be able to handle the projected container traffic volume.

The transport by rail from Poti to Yerevan takes on average three to four days; by road only 1 - 2 days. The long journey time by rail and the bureaucratic procedure at Poti results in a market share for the railways of only 37 %. At Karmir Blur, 40' containers can only be handled by a railway revolving crane and the state-owned trucking company do not have container road delivery vehicles for 40' containers. In the winter time, due to extreme weather conditions, the market share of the railway increases.

No cargo information system exists. Information can only be transmitted by telephone via Moscow, a connection which only works infrequently.

Taking into consideration the projected traffic level and the rehabilitation measures proposed, there will not be any physical constraints for container handling by ARM. The container train link Tbilisi - Yerevan including improved marketing and information systems (see section 6.1.3.4 below) will promote container transport by rail and offer better opportunities for container transport by rail to Iran and Turkey in future.

6.1.1.2 Azerbaijan State Railways (AGZD)

The first significant traffic drop occurred during the years 1990 and 1991 (cumulated decrease of 20%), and can be attributed to the collapse of the Soviet Union and disruption of the business relations within the former Soviet Union and with the East European countries. A second drop, even more significant occurred in 1992, which corresponds to the closure of the Nakhichevan line. This decreasing trend accentuated in 1993 and 1994 as political unrest in the secessionist region of Chechnya caused frequent closures of the Northern border. Globally, AGZD has lost 92% of its freight traffic, as compared to the 1989 level.

Table 6.1.1-3: Freight traffic - AGZD

Year	'000 tonnes	%	'000 tonne-km	%
1989	91,562	100	44,895,200	100
1990	80,205	88	37,076,000	88
1991	73,043	80	30,478,525	73
1992	39,749	43	13,782,205	31
1993	24,992	27	7,301,377	16
1994	12,952	14	3,312,093	7
1995	9,073	10	2,409,000	6
1996	6,896	8	2,068,662	5

There are no major seasonal traffic variations over the year. Traffic peaks occur during the summer time when the weather conditions are better.

The main freight stations are Baku Tov., Karadag, Kyrdamir, Mingechaur Main Station, Gyandsha, Shamkhor, Dollyar, Kiliasi, Sumgait, Gyuzdek and Vatagi. Freight transport is not hindered by the extent of the facilities, but rather by their condition (see section 1.4.2 and Annex 1.4-2). Annex 1.4-2 also contains the number of forwarded and received wagons in 1995 as well as the volume of forwarded freight traffic (tonnes) in 1995 for the main stations selected.

In line with freight traffic, the circulation of freight trains has also decreased on the network. Some trains are formed at the loading yards. The capacity of the large marshalling yards at Baladshary and Shirvan has only been used to a very limited extent since the beginning of the 1990's.

AGZD has a special unit for the transport of oil products. This department has its own dispatching to control oil products traffic. The existence of this unit - entirely devoted to one category of goods - could be the embryo for a business unit, as commonly found at European railways, and the principle of which is to mix the commercial and operational activities, in order to better serve the customer.

Marketing activities have developed only recently in connection with the implementation of the Trans-Caucasian-Logistic-Express Poti/Batumi - Tbilisi - Baku in 1996.

Container traffic

In 1996, Azerbaijan State Railways received 389 loaded containers (TEU) and forwarded 86 loaded TEU (= 22 % in comparison with the received containers). That means, there is also an imbalance of the traffic. The number of containers handled by each of the existing terminals is presented in Annexes 1.5-5 to 1.5-7. The main commodities are foodstuffs and equipment for the oil industry.

According to information received from the railway, AGZD was supposed to be allocated 1,817 20' containers after the division of the containers stock of the former Soviet State Railways; however, the number of containers actually received is not known at AGZD. 40' containers can only be handled at Baku Sea Port. The proposed new terminal at the port will be equipped with lifting devices for 40' containers. This terminal will be operated by an independent company and will handle the containers for the port and for the railways. However, AGZD and the Sea Port are proposed to be shareholders.

Since 1991, the container traffic volume decreased faster than the total traffic volume:

Table 6.1.1-4: Container traffic - AGZD

Year	total freight volume '000 tonnes	container traffic volume '000 tonnes	
		total	hereof 20' containers
1991	73,043	292	75.3
1992	39,749	150.2	34.9
1993	24,992	72.2	29.0
1994	12,952	30.8	8.7
1995	9,073	11.2	2.7
1996 ¹⁾	6,896	9.9	0.2

¹⁾ only January to September

In the connection Poti - Azerbaijan, only 20 % of the containers were forwarded by rail in 1996. The journey time by rail is much longer than by road. The institutional constraints are the same as explained above.

In order to improve container transport by rail and to make it competitive, the Trans-Caucasian-Logistic-Express between Poti and Baku was implemented in 1996. 891 20' containers and 428 40' containers were transported between the inauguration on 11th November, 1996 and 23rd July, 1997. However, no information concerning the commodities carried was made available. Institutional constraints must be eliminated and marketing improved. In line with the objectives of the current project, operating companies for the Trans-Caucasian-Logistic-Express and the container train link Tbilisi - Yerevan shall be established.

The cargo flows through the ports of Baku, Poti and Batumi are described in Chapter 3. The present situation and the possibilities for development were investigated in the framework of other Tacis / TRACECA projects (e. g., "Development of the Port of Baku - Port Master Plan") and are not repeated in this chapter.

Taking into account the projected traffic level and the rehabilitation measures proposed, including the construction of the new container terminal at the sea port of Baku, there will not be any physical constraints for container handling by AGZD. The envisaged container transport, especially cotton from Central Asia, will require an increase in the number of container trains between Baku and Poti up to one train per day.

6.1.1.3 Georgian Railways (GRZD)

The transport volume dropped from 36.2 million tonnes in 1988 to 4.7 million tonnes in 1995. This represents a reduction to 13.0 %. The transport performance decreased from 12,591 million tonne-km in 1988 to only 1,246 million tonne-km in 1995, i. e., to 9.9 %.

Due to the economic changes and the political situation in the Caucasus region, the traffic flows have changed both in direction and in composition. Freight transport is seriously hindered by the interruption of international railway connections. Thus, the transit line between Poti / Batumi and Baku via the border station Beyuk-Kyassik plays a very important (strategic) role. The significance of this line has even increased because of the blocking of important international links, due to the political situation in the region. GRZD handles about 75 % of their transports on this line. The detailed figures are presented in Chapter 3.

The major commodities transported in 1996 were grain and cereal products (31 %), oil and oil products (28 %), construction materials (10 %), fertilisers and chemical products (5 %). There are no seasonal traffic variations over the year worth mentioning. Freight transport is still the backbone of the Georgian Railways.

The main freight stations are Poti and Batumi followed by Zestafoni, Samtredia, Tbilisi Usl., Khashuri and Tbilisi Tov. Freight transport is not hindered by the extent of the facilities, but rather by their condition (see section 1.4.3 and Annex 1.4-3). Annex 1.4-3 also contains the number of forwarded and received wagons in 1996 as well as the volume of forwarded freight traffic (tonnes) in 1996 for the main stations selected.

At present, only at the ports of Poti and Batumi considerable amounts of cargo are being loaded. For some years, the number of freight trains has been decreasing significantly. For instance, before 1990, five block trains with supplementary materials ran from Dedoplistskaro to Rustavi per day; in February 1997, only ten in the entire month. The capacity of the marshalling yards Samtredia and Tbilisi has only been used to a very limited extent since the beginning of the 1990's.

Freight transport is also suffering from the absence of any marketing. The "co-operation" with the customers follows more or less the Soviet era rules ("*We are waiting for the clients.*") and is severely hindered by the inadequately functioning communications system. No steps towards reorganisation and market orientation have been initiated or planned so far.

Container traffic

As stated in Chapter 3, the container traffic to the Caucasian region has increased over recent years. The major portion comes via the Black Sea Port of Poti to this region.

The share of the railways in container traffic varies from 20 % (to Azerbaijan) to 37 % (to Armenia).

According to the figures provided by GRZD's Freight Department, the container traffic volume as well as the share in the total traffic volume has decreased steadily. There is also an imbalance of the traffic. The number of containers handled by each of the existing terminals is presented in Annexes 1.5-8 to 1.5-10. Like in the other countries, the main commodity is foodstuffs.

Table 6.1.1-5: Container traffic - GRZD

Year	container traffic volume (tonnes)	share of the total traffic volume (in per cent)	
		total containers	hereof 20' containers
1991	314,763	1.6	0.6
1992	87,871	1.1	0.5
1993	38,897	0.7	0.3
1994	13,655	0.25	0.1
1995	2,256	0.07	0.02

According to information received from the railway, GRZD has been allocated 1,719 20' containers after the division of the container stock of the former Soviet State Railways.

The main deficiencies are the same as explained above:

- poor condition of the container terminals and handling equipment
- very long journey times
- 40' containers can only be handled at the sea ports
- institutional constraints
- lack of marketing

Taking into account the projected traffic level and the rehabilitation measures proposed including the construction of the new container handling areas at the railway stations in Poti and Batumi, there will not be any physical constraint for container handling by GRZD.

6.1.1.4 Transport planning

Concerning transport planning, the procedure of the former Soviet State Railways is more or less still practised. There are three ways to organise a transport (normal procedure, last minute procedure for CIS clients, procedure for transport outside CIS).

Under the **normal procedure**, clients' requests are sent to the planning service, while technical information goes to the operations service. All data are processed and organised by the statistics unit, and the computer centre. After being computed, clients' requests are examined by the planning service, which makes necessary ad-

justments, then establishes a monthly forecast. The output of the planning departments (monthly plans) are then transmitted to the relevant stations, and at the same time to the operations department. This department produces the timetables and diagrams that will serve as the base for activities of all the staff involved in formation and running of trains. These procedures are quite similar to the ones in use in most European countries. Only the delays for processing the information are longer, since most of the work is done manually. At present, the modernisation / computerisation of information processing is not considered a priority.

There is another **specific procedure for "last-minute" clients, which concerns only clients in the CIS**. In this case, the customer must write a letter to the General Manager, who forwards the order to the planning service department in order to examine whether it can fit into the general transport plan. If it can, the General Manager may give a special instruction which is transmitted directly to the station masters concerned. In the meantime, the customer must transfer the money from his bank to the financial department of the railways. When the payment has been received on the railways' account, the financial department informs the station master to put the wagons at the disposal of the client, and to proceed with the transport. The client will be directly informed by the station master. Within the CIS, the fares for all transports have to be paid 100% in advance either in Roubles, or in the national currency. This procedure typically requires two days.

In the case where **the transport originates from or goes to a country outside the CIS**, the client must also send a written order to the General Manager. In such cases, payments have to be made in US\$. After the financial department receives the payment, and if there is no objection from the General Manager, instructions are passed to the relevant border station managers, to proceed with the transport.

6.1.1.5 Product definition

In general, freight traffic can be divided into the following **products or sub-sectors**:

- Trainload bulk freight
- Wagonload freight (full load traffic)
- Multi-modal freight (Combined Traffic and Container Services)

Trainload bulk freight

The traffic concerned is primarily moved in trainloads, and this applies particularly to oil products, iron and steel, construction materials, etc.

Of course, some of these commodities will continue to be moved by traditional wagonload service, but the objective is to convert as much of the traffic as possible to trainload operation.

Such stable traffic naturally lends itself to long-term contractual agreements with customers, and the identification and dedication of specific resources (locomotives, wagons, staff).

Wagonload freight

Traditional freight traffic offered in units of single wagons forms this sub-sector. It tends to relate to markets which are different from those in the trainload bulk sub-sector, including such traffic as machinery, foodstuffs, manufactured goods, etc., which does not arise in such large volumes.

Multi-modal freight

The development of multi-modal traffic is seen as being particularly important to Armenia, Azerbaijan and Georgia and transit to Central Asia.

Generally, the concept of multi-modal transport can be defined as the organisation of carriages of goods in one and the same loading unit (container, swap-body, piggy-back or semi-trailer) which uses successively several modes of transport without handling the goods themselves in changing modes. The organisation falls under the control and responsibility of one unique organiser, in most cases a freight forwarding company.

According to the Progress Report: "Forwarding - Multi-modal Transport Systems" prepared by BCEOM in association with Systra and DE-Consult in September 1996, each participant in the region considered (railway, national and international trucking companies, etc.) currently has a specific approach which excludes any type of co-operation and joining interests with other partners. There are no independent combined transport operators able to assume the responsibility of organising international multi-modal container traffic from the origin to the final destination.

Railways continue to use the general organisation and procedures (tariffs, liability regulations, container exchange, use of wagons, etc.) which were in force for container transport in the former Soviet Union. Although, the technology used is specific to container transport, old habits and behaviour inherited from the Soviet era continue to prevail. Specific technical and operational measures (collection and delivery by truck, provision of containers, special tariff for containers, simplified documents, procedures and regulations, etc.) are not implemented. The first step to overcome this situation was the implementation of the Trans-Caucasian-Logistic-Express.

Poorly equipped road hauliers are operating individually in this market, far from co-operating with railways (no sub-contracting agreements to perform the main long-distance traction by rail from terminal to terminal).

According to the former Soviet standards, the system of unified transport units is divided into three groups:

- large containers (20', 40')
- medium-sized containers (3 and 5 t)
- small containers (0.25 and 1.25 t)

The stock of 20' containers does not meet the demand of the potential traffic. These containers comply with the international ISO standards and other rules for container traffic. The 20' container fleet comprises only universal containers with one door on one end. Special containers are not available.

The owners of 20' containers are the railways, the shipping companies, forwarders, industrial and trading companies. Therefore, there is no necessity for the railways to obtain new 20' containers within the next few years. The biggest problem is the very poor condition of the containers mainly caused by improper handling at the terminals and on the customer premises. There are no repair shops located in the Caucasian countries.

The Caucasian railways do not have any 40' containers. There are no cranes with a lifting capacity of 40 t and no spreaders to handle them. 40' containers can only be handled at the sea ports (Baku, Poti and Batumi). At Karmir Blur, 40' containers are lifted by a railway revolving crane. Furthermore, the state-owned trucking companies do not have container road delivery vehicles for 40' containers.

In general, the maximum trailing load of freight trains amounts to about 3,000 to 3,500 tonnes with some exceptions (e.g. between Zestafoni and Khashuri 2,500 tonnes). The maximum freight train length is 850 m (on some sections 1,050 m). Thus, there is no major problem to organise special multi-modal trains since container trains are normally shorter and lighter than normal heavy freight trains.

In general, current local participants in container freight forwarding have a poor perception of marketing techniques as a tool to increase revenues. They merely try, when asked, to meet the needs of international freight forwarders or shipping companies who intend to use container transportation in the Caucasus region. In most cases, the initiative comes from the customer himself. Operators do not have any marketing strategy. Customers usually demand special tariff measures or a general discount in the form of commissions shared with an intermediary company. However, certain national transportation intermediary companies which have a great deal of experience and use innovative approaches are gradually replacing specialised railway departments and trying to successfully obtain lower tariffs from multi-modal transportation suppliers as well as increased service quality.

There are many bureaucratic obstacles and institutional constraints that discourage clients from using the railways for the conveyance of containers. The local authori-

ties are not given any competence. The use of the Trans-Caucasian Logistic-Express is also hampered by the current procedures. To give one example: The clients are forced to go to the GRZD's headquarters in Tbilisi in order to pay the carriage charge and to present the invoice to the station master at Poti afterwards. A transfer of the charge to the railways' bank account is not possible. This procedure is very time-consuming and discourages many potential clients.

Available statistics are particularly poor as they are rarely separated from normal railway traffic; data on the number of containers handled are unreliable and incomplete; final destinations are not known or in the best case just up to the "destination frontier". The analysis of container traffic including the market analysis as well as the forecast are presented in Chapter 3.

6.1.1.6 Operations

The major shortcomings hampering railway operations and efficient performance on the Caucasian rail network have been identified as follows:

- interruption of operation of important rail links such as Baku - Dshulfa - Iran, Tbilisi - Sukhumi - Russia, Tbilisi - Yerevan/Masis - Dshulfa - Iran and the Baku - Aktau railway ferry link
- some sections have excessive curves and gradients, e. g., Zestafoni - Khashuri (GRZD) with minimum radii of 158 m and gradients up to 29.9‰, making operations extremely difficult especially during the winter
- general speed restrictions and many temporary speed restrictions
- poor availability and lack of proper maintenance of locomotives and rolling stock
- low reliability of shunting locomotives
- station tracks occupied by a large number of wagon unused or awaiting repairs
- inadequate wagon and locomotive inspection facilities
- inadequately functioning signalling and telecommunications system
- poor state of train control system, leading to the unacceptable situation in which the traffic controller has incomplete knowledge and control of what is taking place on the line
- lack of reliable power supply (irregular power supply with frequent interruptions in Georgia) and very poor condition of traction power supply (especially in Armenia)
- lack of spare parts for railway equipment
- timetable for freight trains not adhered to

The reduced number of trains operating on the networks reflects the much lower freight and passenger transport volumes

On the other hand, commercial speed has declined and travel time has increased significantly. In general, the number of motive power units seems to be more than sufficient for the present level of traffic. However, as a reaction to theft and deteriorating maintenance condition, the railways have decided to assign crews to specific locomotives, as was the case in the steam engine era, so that frequent changes of locomotives are required. This, the extended travel time and the low reliability of the locomotives altogether result in excessive demand of locomotives and rolling stock.

In view of the low operating density, there are presently no capacity constraints even in single-line sections.

Train formation and scheduling

The following categories of freight trains are normal for the Caucasian railways:

- **Block trains** (normally single customer; mostly conveying a single commodity from one private siding or freight station to another private siding or freight station without any intermediate marshalling)
This applies particularly to bulk freight, such as petroleum products, iron and steel, construction materials, etc. Due to restricted length of the private sidings and because they are not electrified, most of the block trains run only as far as the adjacent freight yard. The wagons are transferred by shunting movements to the consignees or from the consignors. Most of these industries possess diesel locomotives for the manoeuvring of the cargo and for shunting of the wagons in their premises.
- **Wagonload or trunk trains** (different customers; carrying mixed commodities from one marshalling yard to another marshalling yard without any intermediate shunting operations)
There are regulations specifying, for each marshalling yard and shunting yard, the trains to each adjacent yard, their routing, permitted loads and programmed locomotive types.
- **Local freight trains** (different customers with mixed freight; operating from one marshalling yard or shunting yard to another marshalling yard or shunting yard with stops to collect and/or set down wagons as required at intermediate shunting yards)
Shunting stations can be defined as collection points for individual wagons, shunted together without sorting or coarse shunting only, for movement by trip or pick-up goods train to the nearest marshalling yard or shunting yard.
- **Trip or pick-up goods trains** (different customers; operating between marshalling yards or shunting yards; collecting and / or dis-

tributing single wagons or wagon groups with mixed freight at private sidings, freight stations and intermediate shunting yards)

Wagons on pick-up trains are formed in the originating station in groups corresponding to the order of arrival at destination stations. The wagons added at intermediate stations are not sorted.

- **Transfer trains or shunting operations** (collecting and distributing of wagons into shunting yards by local shunting locomotives from private sidings and / or freight stations)

Presently, all freight trains operate only when they reached the stipulated minimum tonnage varying from 750 tonnes to 2,000 tonne. This procedure is customer-unfriendly and discourages clients from using the railways.

Block trains and trunk trains should be classified as **mandatory trains** running according to a rigid timetable adhered to and irrespective of available traffic or the stipulated minimum tonnage. The customers should be kept informed of the time table. In a first step towards a "relaunch" to regain lost traffic, the stipulated minimum tonnage should be reduced and customers informed accordingly. The other categories of trains should be classified as **conditional trains** and operate according to demand only.

6.1.1.7 Summary

The main deficiencies can be summarised as follows:

- interrupted international lines
- absence of any marketing
- very poor condition of the wagons, mainly due to overdue periodic maintenance and general overhauls
- poor condition of the loading and unloading facilities as well as loading equipment
- low commercial speed and as a consequence long journey times
- frequent interruption of operations
- timetable for freight trains not adhered to
- very poor reliability of freight transport

6.1.2 Freight market analysis

6.1.2.1 Transport corridors between Europe and Central Asia

6.1.2.1.1 Non-TRACECA corridors

The TRACECA corridor is not the only available transport corridor from Europe to Central Asia. Below a general overview over the different routes is given with regard to suitability and main strength and weaknesses of those main corridors which are available for transport of goods. The origin has been chosen to be Central Europe which for the calculation of distances defaults to Frankfurt/Main in Germany. For the convenience of comparison with the TRACECA corridor, Baku has been selected as target city. All corridors are however suitable for transportation up to Central Asia (mainly to Uzbekistan/Turkmenistan).

The key data for these routes in numerical format are added in table 6.1.2-2 below, when the corridors are compared with the TRACECA corridor.

General observations

All links (corridors) that are described below are suitable to transport goods between Europe and Central Asia. However due to the rather limited goods exchange between these poles, it is not possible to identify all strength and weaknesses of all corridors. Even forwarders that do have regular transports to the region, would not select preferred routes for the goods, but would investigate several possibilities due to the constantly changing conditions. No forwarder contacted is specialised in transports between the two regions so that most of them start "from scratch" each time a customer is approaching them with transport needs between Europe and Central Asia.

This situation leads to the following statements that have to be considered, when evaluating the corridor comparison that is performed in the following paragraphs:

As far as possible the data have been updated to August 1997. The political situation can modify transport prices, times and routes within a rather short delay. The most likely tendencies in terms of general political and economic developments are contained in Chapter 3.

There may be routes that might come up in the medium term for which information is not available at present, as there might be no goods transport today.

The data collected and presented in Table 6.1.2-2 below may change within short notice. It is hardly possible to get quotations for general cargo, as most shipping companies ask for more specific goods details even when packed within containers. In these cases household goods were taken as goods description.

Europe - St. Petersburg - Russian channel system - Baku

The first link is mainly used for inner-CIS transports. It uses the canal system in Russia to get to the Caspian Sea. As far as international trade is concerned this transport corridor is mainly suited for goods originating of northern countries or for sea ships that cross the ocean into the Baltic sea. Thus it is hardly suited for goods originating in Central Europe.

The second disadvantage is the typical concentration on bulk goods. At present it would not be possible to ship small quantities of 2 to 3 containers. In general a shipload has to be chartered (approx. 1,000 tons).

The availability of the corridor amounts to only 7 months per year, as the channels can not be used in the winter period.

As far as the destination is concerned, there is no difference in choosing Baku or Turkmenbashi, as there is a similar distance and time to both harbours.

The main advantage of the link is the transportation charge. It has been only estimated by forwarders, as it has not been used for general cargo by the shipping companies interviewed.

Europe - Belarus - Russia - Baku

This transport corridor is a railway only link. It is similar to the railway connection in the times of the Soviet Union. Transfer point is Brest. There is however a change in the alignment, as the standard route now uses Belarus eastwards to enter Russia short before Smolensk, while in former times the main route switched southwards into Ukraine.

The rail link has been traditionally used for all type of goods coming from central Europe and the North Sea ports.

The main advantage and disadvantage is the transport mode itself: rail. As far as weaknesses are concerned, forwarders mention the problems of safety and breakage. The biggest weakness, however, was the political situation in Chechnya which hindered the usage of this corridor for a considerable period.

The main advantage is the comparatively low distance in spite of the fact that it increased by roughly 300 km due to the re-routing mentioned above. The other advantage is the reliability of Russian railways that still manages the transport needs on its network even when the technical and financial problems are growing constantly.

The container traffic is handled by special companies which use the containers of the Russian railways which takes over the key task of recollecting the containers.

Europe - Mersin - Baku

This is a sea link which uses sea links from the North Sea ports to the Turkish port of Mersin directly (without feeder). From Mersin the cargo has to be carried on by trucks to the Turkish border with Georgia. Seen from a logistics point of view, it might be more economical to cruise to the town of Trabzon in the Black Sea. However, the forwarders interviewed could only state that the port of Mersin "was more active".

Quotations are given mostly for containers. Forwarders interviewed say, however, that also non-containerised general cargo could be shipped to Mersin.

The main strength of this route is the comparatively cheap sea section up to Mersin. It is also said that transfer to truck is smooth in that port.

The weakness is the high transport charge for truck transport to Georgia and Azerbaijan.

The link is also usable for transports further to Central Asia via the rail ferry that today also (even mainly) carries trucks.

Europe - Bandar Abbas - Baku

There are several shipping companies that serve the port of Bandar Abbas. From that port to Azerbaijan there exist links by road and rail. The rail link is at present not usable due to the political situation.

The link is thus at present only usable to consignments that can be carried on trucks.

The main strength of that link is the well served port. Another strength is the competitive position of Iranian trucks in the transport market. The low fuel prices and seemingly huge tanks give truckers advantages in comparison e.g. to Turkish trucks.

The main weakness is obviously the long delay in transport time due to the sea transport. Another weakness is the political situation with the tensions especially between the USA and Iran. This might affect shipping companies using Iranian transport means with eventual business with the USA.

Iranian truck drivers need visas for Azerbaijan. Sometimes these are difficult to get. This compares unfavourably with Turkish truck drivers.

Iranian railways have established recently a link to Turkmenistan. Thus, the corridor could also be used for transports to Central Asia (and other Asian countries). The forwarders interviewed have little experience with Iranian railways.

6.1.2.1.2. TRACECA corridor

There are two basic transport modes in the TRACECA corridor: Road and Rail. In the former Soviet Union there was a preference for rail transport. Due to its inherent efficiency, the road has gained important market shares under the condition of strongly decreasing transport volumes.

The technical situation is characterised by a deteriorating infrastructure for both modes. While the railway is in need of maintenance work as proven by various studies in this programme, the road is hardly maintained, as well.

In line with the general experience with infrastructure development, it must be expected that road infrastructure will receive more financial means to develop into a modern transport system. It can, however, not be expected that the Georgian section will give decisive infrastructure advantages to truck transport in the medium term (5 years).

As far as the organisational situation of both modes is concerned, there exist significant differences: the railways in Georgia and Azerbaijan are state-owned entities that are under relatively direct supervision of the corresponding ministries.

The road transport sector has developed into a peculiar form of organisation. It seems that the truck pools of the former truck holding companies are hired out to individual drivers which pay flat and/or business dependent rates. While the drivers are entrepreneurs, they may have middlemen who receive the transportation charges and pay the drivers according to the days worked. Due to these hardly transparent situation, the costing of transport has been undertaken by using net driver salaries without entrepreneurial overheads.

It is not obvious how future developments will affect transport organisation and the cost situation. While there may turn out traditional truck transport enterprises that enter into competition by offering the lowest prices possible, it seems that there is a slightly greater possibility of transport remaining dominated by driver influence working in a co-operative system. The reason is mainly the better remuneration that the present system yields. This is valid at least in the medium term.

Before it is possible to analyse the TRACECA corridor, it is necessary to see first the various access/outlet routes leading to the Georgian side of the corridor from Western Europe.

Access routes

Tab. 6.1.2-1: Access/outlet routes for the TRACECA corridor

No	Access route	Transport Mode	No. of Trans-shipments	Length (km)	Time (days)	Charges
1	Road via East Adriatic states and Turkey	Road	0	4,300	14	6,000 US\$ p. truckload
2	Ship via North Sea / Atlantic port	Ship Ship	1	8,000	24	2,800 US\$/ 20' Cont.
3	Road via Italy / Ferry to Greece / Road	Road Ferry Road	0	5,500 (5,300)	10	6,400 US\$ p. truckload
4	Road via Eastern Europe / Ferry	Road Ferry Road	0	3,400 (2,200)	6	...
5	Road / Adriatic Port / Ship	Road / Ship	1	5,400	19	2,800 US\$/ 20' Cont.
6	Rail / Adriatic Port / Ship	Rail / Ship	1	5,400	20	2,400 US\$/ 20' Cont.

Table 6.1.2-1 gives a survey of key data of the access/outlet routes for the TRACECA corridor. It becomes obvious that there is not just the one TRACECA corridor from Europe to Central Asia. It also becomes clear that a number of transport routes are competing in the transport service market. This will be more interesting in the medium run as country specific regulations will be set up that might favour or discourage the use of certain access routes.

The first access route is still the most popular for general cargo of medium to high value. It can be assumed that it will regain substantial market shares with the continuing normalisation in the former Yugoslavian states.

The shipping route via the North Sea and Mediterranean Sea can be undertaken from any seaport of the mentioned coast. Due to the reduced traffic volumes there are as yet no direct shipping lines. Freight has to be feedered by smaller ships. The feeding takes place in Southern Italy or Greece.

The road link via Italy was a natural route when Yugoslavia was closed for transit. It has the additional advantage of presenting fewer borders. This translates among others to a clear reduction in travel time.

There seems to be a Ro/Ro connection from Constanta in Romania to Georgian ports. In Soviet times this link used Trabzon as target. In the courses of interviews made no shipper could be identified who uses the route.

The road/rail connection via the Adriatic ports is mainly used for limited traffic volumes directed to Southern Europe. It is, however, an interesting transport mode especially with a view to strengthen the rail transport in the TRACECA corridor.

It goes without saying that any road transport on the access routes will not tranship the load onto rail for further transportation. Thus, those access routes which arrive at Georgian ports should be strengthened.

The column on transshipments reflects only the transshipments *within* the access route. For all water bound transport modes, there is an additional transshipment in Georgian ports (except for the planned rail ferry).

The length is a rough indication of the distance and was calculated based on shippers interviews and United Nations ESCAP maps. As a point of reference, Frankfurt/Main was used as origin in Western Europe. The transit times are based mainly on shippers' and forwarders' information.

The price (= transportation charges) column give forwarders' estimates for goods that are typical for the transport mode and the link. Some remarks have to be made: The transportation charges mentioned in the last column of Table 6.1.2-1 for the waterborne transports are limited up to a Black Sea port. The costs of the TRACECA corridor have to be added. The costs for trucks are specified up to a point around Tbilisi. Thus roughly 75 per cent of the price of transportation in the corridor have to be added to become comparable with the competing corridors in Table 6.1.2-2.

General aspects

In spite of the considerable price, it seems that the truck link is by far preferred for general cargo which is valuable (spirits, computers etc.) It can therefore not be expected that these cargoes might be shipped via sea/rail. The differences in travel time do not seem to be of much concern to the customers /shippers as long as the goods arrive safely. All the time won by a fast road haulage can be lost in customs.

Medium-term development

According to the forecasts, it can be expected that in the medium run the water transport to Poti will become much more attractive, as the amount of goods will increase strongly. The same is said about the seaport Baku.

6.1.2.1.3 Overall comparison

Table 6.1.2-2 presents some key data on available transport corridors for comparison. It contains the four routes described in 6.1.2.1.1 and the TRACECA corridor. To include the TRACECA corridor, a decision had to be made with regard to the access/outlet link (see table 6.1.2-1). Link no. 2 - Atlantic port has been chosen. The choice is based on the exclusion of the other alternatives:

- Direct truck transport is more of an alternative than an access to the TRACECA corridor. It will not be suitable for increased transport in the medium term. It is by far the most extensive mode that will be used for special goods.
- The shipping links via North Adriatic ports are at first sight the most logical transport solution. At present there is, however, very little traffic dispatched on these links which makes quotations unreliable and which seems to indicate that forwarders do not prefer these links.
- The link via Constanta had not been used by any forwarder contacted.

Tab. 6.1.2-2: Main transport corridors Europe - Central Asia

No	Transport Corridor	Transport Mode	Number of Transshipments	Length (km)	Time (days)	Price (US\$ / 20' Cont.) rounded
1	Europe St. Petersburg Baku	Ship Ship	2	1,700 4,800	4 25	140 (minimum 1,000 t)*
2	Europe Belarus Russia Baku	Rail Rail Rail	1	1,350 600 2,800	20**	3,200
3	Europe Mersin Baku	Ship Truck	2	7,000 2,000	20 10	4,900
4	Europe Bandar Abbas Baku	Ship Truck	2	10,900 2,200	30 10	4,700
5	Europe North Sea Port TRACECA Baku	Ship Rail	2	8,000 950	24 5	3,700

* 1 ton , ** 12 days for a block train with min. 20 Containers.
Sources: information from shipping companies

As already stated above, in the table 6.1.2-2 the term Europe defaults to Frankfurt/Main (with distances and times rounded).

General aspects

A comparison of the different corridors can obviously not be made on price alone. Sending parties and forwarders reflect many aspects before they arrive at a final decision. The aspects are varying with the type of goods. Overall topics are always safety against breakage and theft combined with an economical solution.

A decision situation may be modelled by using the data presented in table 6.1.2-20 and some judgements that can not be listed by using a table. Therefore the comparison is based on the following criteria:

- number of transhipments
- time
- cost
- intangibles

Transhipments

The number of transhipments can be used to indicate the safety of the goods as theft and breakage are frequently taking place during transhipment. As can be seen, the number of transhipments is equal for all corridors except the railway link.

If - in the medium term - the ferry to Turkmenbashi will use special trailers, then each link when used for transports to Central Asia will have an additional transhipment in Baku. This could only be avoided by using the truck or using the rail link via Kazakhstan, which was actually used during the closure of other rail links, but which is definitively not competitive for transports to Uzbekistan/Turkmenistan.

As a result, it can be stated that in terms of transhipments the rail link via Brest/Smolensk is to be preferred.

Time

The data compiled in the table have to be regarded from a forwarders viewpoint. Seen from this angle, the transport times are identical. If time matters, then trucks and forwarders with excellent relations to customs are needed. An exception would be the usage of block trains via Brest/Smolensk, which is stated to be noticeably faster than the links involving sea transport. However, the volume of load required excludes this timing for most transports.

Cost

While it has been undertaken to present cost data in the table, it has to be reiterated that quotations vary considerably for different sorts of general goods during different seasons and with the political development in the region. In addition there is the normal price difference between different forwarders. As an example it might be stated that the rail link via Brest/Smolensk has been quoted for the same goods and on the same date with nearly 40% difference.

Considering that, it appears that pricewise the recently opened railway link has an advantage over the links involving sea transport and transshipments. The TRACECA corridor with the present low rail tariffs is not much apart.

If the road transport had been used to calculate, then the price would have been approx. 1000 US\$ higher. Concentrating on that price, a statement could have been made that no transport via Georgia/Azerbaijan is feasible using truck transport between the two seas. This would have been a wrong statement, as can be easily seen, when looking into the daily transport volumes. This again is underlining that it is not only the price which decides on corridor usage.

Intangibles

The corridors discussed here can be classified as medium distances, which do not automatically exclude neither mean of transport.

It is a general fact that most forwarders do not like railways. The reasons are mainly danger of breakage, big inflexible organisations and limited possibility of locating the position of goods. The same applies, however, to sea transports. The road transport is generally the forwarders preferred mean of transport.

There are lots of intangibles that enter into decisions of shippers and forwarders. They can't be valued mathematically, but the results can be seen by observing the actual transport flows.

Result

In most of the discussed aspects - especially price, the railway link between Western Europe and Baku has slight advantages. This still applies for the continuation to Uzbekistan/Turkmenistan considering a truly working ferry link between Baku and Turkmenbashi.

This is, however, not backed by the actual transport flows. While the rail link remains with lot of capacity, the container transport to Poti has reached levels, where congestion surcharges are requested.

Thus in spite of having slight disadvantages (transhipments, price) the TRACECA corridor seems to be the preferred one.

In the medium term, it may be expected that the TRACECA corridor might become even more prominent, assuming that the financial problems of Russian railways will persist and that the political situation will limit the significance of the Iranian corridor via Bandar Abbas. Then the TRACECA corridor might (continue to) be the preferred route between Western Europe and Central Asia.

6.1.2.2 Transportation charges and cost situation in the TRACECA corridor

6.1.2.2.1 Rail

Containers

In order to start up the Trans-Caucasian Logistic Express within the framework of the TRACECA project "Pre-investment study and pilot train Baku - Tbilisi - Poti/Batumi" a tariff was needed. After a careful analysis of the tariffs existing for rail transport, the TRACECA project team proposed an introductory tariff, which was agreed upon on 17th October 1996 between Azerbaijan and Georgian Railways.

It must be stated that the rail tariff is not the exact fee as the document states a large number of charges. The following table presents a survey of various additional transportation charges.

Tab. 6.1.2-3: Port processing costs of 20' containers in Poti port

Category	20' Container loaded (US\$)	20' Container empty (US\$)
Handling	65	33
Document processing	110	110
Other (storage fees)	15	15

An approximation for a typical transportation charge can be given in the following list. It refers to a container transport from Poti to Baku. In order to compare with road transport at a later stage, it is assumed that the container is delivered to a customer in the Baku area. In both cases, the price includes the empty return of the container back to Poti. As a matter of convenience, the prices of the railway transport are rounded.

Tab. 6.1.2-4: Estimate of total transport charges for a 20' container

Category	Price US\$ per 20' container
Transport	470
Handling	100
Document processing	110
Other	30
Delivery and Collect.	150
Forwarder's charge approx. (5 per cent)	50
Total:	910

General cargo

It is proposed that the Logistic Train as the product of a future operating company will not only transport containers but also general cargo. The transport charges for general cargo are not uniform. At present (and it is also expected for the medium term future) the tariffs are applied to special types of goods. While there are relatively few categories in Georgia, there are many different prices in Azerbaijan. The following table presents a survey of key data.

Tab. 6.1.2-5: Selected transport charges in Georgia and Azerbaijan

Price of 1 ton (50 tons for 100 km), in US\$		
	Georgia	Azerbaijan
General import/ transit goods	3.62	
General local goods	2.89	
Metals		3.48
Industrial goods, local		3.48
Oil, local		3.89

In Azerbaijan some transport charges for exports are well below the local charges. This is demonstrated by the prices for the transport of one ton of goods for the 498 km between Baku and Beyuk Kyassik (border with Georgia).

Tab. 6.1.2-6: Selected export / transit charges for Azerbaijan

Price of 1 ton (50 tons for 498 km), in US\$	
	Azerbaijan
Oil	7.83
Metals	9.90
Industrial goods	21.74

This means that bulk cargo is benefiting from considerable "discounts", while high value general cargo will be penalised.

As the Logistic Train will transport high value general cargo, there would be the following transport charges for the TRACECA corridor.

Tab. 6.1.2-7: Costs of 1 ton of general cargo in the TRACECA corridor

Price of 1 ton (50 tons for 498 km in Azerbaijan, and 360 km in Georgia)		
	Swiss Francs	US\$ (rounded)
Azerbaijan	29	22
Georgia	15.68	12

The total of 34 US\$/ton or 3.7 US cent/tkm is nearly equal to the one-way charge of a container with a 10 ton content for the Trans-Caucasian Logistic Express. The container transport charge is, however, rebated by 50 per cent compared to the normal tariffs which are shown here. Thus, it becomes clear that the price for container transport is considerably higher than that for general goods.

Cost situation

Markets normally do not accept cost prices. Prices have to be derived from competition of products. Therefore, the setting of cost plus prices tends to fail to include the market signals.

It is, however, important to know the variable costs of the services to be delivered, as this is the basis for the lowest possible price a competitor can fix. It goes without saying that this lower limit could not be maintained for a long time. The variable costs are, however, one of the basic policy variables to investigate within a marketing strategy. A full scale total cost analysis - although it would be meaningful by a scientific yardstick - is hardly feasible due to the following:

- it is a matter of judgement what elements of fixed costs of the railways should be attributed to the Logistic Train, and
- it is extremely difficult to estimate the magnitude of some cost categories i.e. depreciation.

It is equally difficult to calculate variable costs for the railways, as neither of the railway departments have their cost structured according to fixed and variable costs. As a solution to this problem, the variable costs are estimated by using the total costs of the railways as a first approach.

The total unit costs for the railways in 1995 are contained in section 2.4 of this report. The following tables summarise the results.

Tab. 6.1.2-8: Calculation of total unit costs of Georgian Railways

Item	Unit	
Total costs of freight transport	1,000 US\$	15,741
Transport volume	mil. tkm	1,246
Costs per tkm	US cent/tkm	1.3
Container factor		1.8
Costs of container transport per tkm	US cent/tkm	2,4

Tab. 6.1.2-9: Calculation of total unit costs of Azerbaijan Railways

Item	Unit	
Total costs of freight transport(1996)	1,000 US\$	30,858
Transport volume	mil. tkm	2,409
Costs per tkm	US cent/tkm	1.3
Container factor		1.8
Costs of container transport per tkm	US cent/tkm	2,4

The factor to cover for increased costs of container transport of 1.8 has been estimated (i.e. special wagons, special handling infrastructure). By using the values calculated above, the total costs of transportation of 1 container in the TRACECA corridor can be estimated:

Tab. 6.1.2-10: Calculation of total costs for transporting 1 container in the TRACECA corridor

Item	Unit	
Costs of container transport per container/km Georgia (16 tons p. Cont.)	US cent	38
Kilometres in Georgia	km	360
Total costs for Georgia:	US\$	140
Costs of container transport per container/km Azerbaijan(16 tons p. Cont.)	US cent	38
Kilometres in Azerbaijan	km	535
Total costs for Azerbaijan:	US\$	200
Transport costs	US\$	340
add 50 per cent for empty return of container (2,5 tons)	US\$	50
Total transport costs:	US\$	390

note: costs rounded

As mentioned before the cost figure of 390 US\$ refers to total costs. As most of the costs indicated are fixed costs, the variable costs are much below this value. As an indication of the variable costs the following table indicates the costs for energy and personnel for a train based on data of the railway department in Azerbaijan.

Tab. 6.1.2-11: Indication of variable costs of container transports

Item	Unit	
Total kilometres of a return trip Baku - Poti - Baku	km (rounded)	2,000
Total hours of a return trip incl. safety margin	hours	70
Driver costs per hour	US\$	0.55
Assistant costs per hour	US\$	0.35
Guard costs per hour	US\$	0.27
No. of guards		2
Personnel costs of a train = hourly costs * hours	US\$	100
Average no. of containers transported (loaded and empty)	No.	20
Personal costs per container	US\$	5
Gross weight of loaded container incl. wagon	t	35
Gross weight of empty container incl. wagon	t	25
Energy consumption	kWh /tkm	0.025
Price of one kWh	US cent	4.5
Total tkm to be transported (50 per cent loaded, 50 per cent empty)	tkm	60,000
Energy costs = tkm * spec. consumption * price	US\$ rounded)	70

The figures show that the costs for energy and personnel amount to approximately 70 US\$. On the one hand, the personnel costs on the Georgian side are lower than the assumed Azerbaijan costs. On the other hand, there is obviously some "variable wear and tear" on rolling stock and track. Consequently, it can be stated that the variable costs of the transportation of one container are in a range between 70 and 390 (say 400) US\$. This has to be compared with the actual transportation charge of 470 US\$.

For the calculations concerning the joint venture, a variable cost value of approx. 1 US cent has been assumed (based on the data in section 2.4).

Thus even with the actual rather low transport charge the railway departments of Azerbaijan and Georgia are contributing to the coverage of fixed costs, and they could even lower that price if the competition would require such an action. This is, however, not to be expected in the near future. This statement is based on the analysis of the road transport.

6.1.2.2.2 Road

Transportation charges

In section 6.1.2.1 some indications on transport charges for the access routes were given. Now, the question of transport charges for the corridor has to be answered. As was mentioned, the organisation of the transport sector was subject to a profound change. There are a few companies with a fleet of trucks. In addition there are individual truck drivers who deal directly with customers, but have to hire out trucks from the old truck owning companies. There are rather few other trucks in any of the countries except those that were available before the political changes. The organisational framework leads to the fact that there are no fixed tariffs for transport of goods in the corridor. There is, however, a system of "informal tariffs" among the truck drivers and it is reported that these "tariffs" are sometimes enforced by illegal means.

It is evident that transport charges are "truck-oriented". There is no possibility of calculating ton-kilometres as there is normally one load only which has to feed the owner/driver. Thus there cannot be much difference between prices for container transport and general cargo, as the transportation charge is for a truck load. A truck load corresponds to one 20' container or 15 tons of general cargo (or less).

In addition to the informal truck charges, there are the forwarding fees. The main forwarders in Georgia and Azerbaijan have indicated transport charges as in the following table:

Tab. 6.1.2-12: Truck transport charges in the TRACECA corridor

Category	Charge US\$
Transportation Poti - Baku or vice versa	1,400 to 1,600
Other costs	200 - 600
Total:	1,800 to 2,100

The price for a container corresponds to 120 - 140 US\$ per ton of general cargo. In international comparison this price is rather high.

Cost situation

As with rail transport at first the total costs of road transport are calculated. Secondly the variable costs as lower limit of competitive pricing has to be focused. The data have been gathered based on interviews with truck drivers and forwarders.

**Tab. 6.1.2-13: Truck transport costs in the TRACECA corridor:
Fixed costs**

Annual fixed costs (US\$)			
		Usage Years	Amount
Truck 5 Years old (i.e. Kamaz 5320 or MAZ 5432) incl. saddle	22,000	7	3,143
Tax			500
Garage			360
Repair			5,000
Total			9,003
Per km running	40,000	km /Year	0.23

The above table presents fixed costs of a typical truck for container or general cargo transport. The investment costs are rather low, as until now there are almost no new trucks in the country. In the calculation it is assumed that most of the repair costs are due to age and not to wear and tear. Other assumptions would not strongly change the results of the above analysis.

A rather decisive variable are the kilometres per year. The value given is very low in international comparison and reflects the low average overall speed of the trucks as well as limited volumes in the transport market. As with all fixed cost distributions, the amount per kilometre is artificial and does not influence economic decisions. The next table indicates the variable vehicle running costs without driver.

**Tab. 6.1.2-14: Truck transport costs in the TRACECA corridor:
Variable vehicle costs**

Tyres		
Number	14	
Price	140	
Total tyre costs	1,960	
per km running	60,000 km	0.03
Diesel	50 litres / 100 km / 0,3 US\$/litre	0.15
Oil	4 litre / 1000 km / 1 US\$/litre	0.004
Total		0.184 = 0.19

The major share of fuel costs in this category corresponds roughly to international data. The outstanding fact is the low tyre consumption, which is only possible by sacrificing security requirements. A "normalisation" has not been applied, as this practice is common among truck drivers and will possibly not change in the medium run.

The next table shows the variable cost elements of road and driver costs. The road costs depend on legal and other regulations. Due to the dramatic financial situation of the states in the corridor, it is hardly to be expected that the level of charges will be reduced.

**Tab. 6.1.2-15: Truck transport costs in the TRACECA corridor:
Variable road costs / driver**

Road Usage Fees	km	US\$
Poti - Tbilisi	350	0
Poti - Baku	1000	450
Tbilisi - Baku	650	200
Poti - Yerevan	550	250
Other Costs		
Poti - Tbilisi		50
Poti - Baku		300
Tbilisi - Baku		250
Poti - Yerevan		100
Drivers		
Poti - Tbilisi		50
Poti - Baku		300
Tbilisi - Baku		250
Poti - Yerevan		100
Variable Road /Driver Costs; Total		
Poti - Tbilisi		100
Poti - Baku		1050
Tbilisi - Baku		700
Poti - Yerevan		450

As far as the "driver's salary" is concerned, only artificial values could be estimated. The reason is that the drivers do not properly know their net remuneration. According to the interviews conducted, it seems that the drivers encash the total transport fee (minus the forwarders charge) and pay variable costs and hire charges for "their" trucks.

**Tab. 6.1.2-16: Truck transport costs in the TRACECA corridor:
Variable costs**

Variable vehicle costs per section (US\$)			
	km	US\$/km	total
Poti - Tbilisi	700	0.19	131
Poti - Baku	2000	0.19	373
Tbilisi - Baku	1300	0.19	243
Poti - Yerevan	1100	0.19	209
Total variable vehicle costs (US\$)			
Poti - Tbilisi			231
Poti - Baku			1,423
Tbilisi - Baku			943
Poti - Yerevan			659

The above table gives the results of the calculations with regard to different sections in the corridor. The most important figure is the value of about US\$ 1,400 for the whole corridor. This figure can be compared to the variable costs of rail transport, which were estimated above 100 to 300 US\$.

**Tab. 6.1.2-17: Truck transport costs in the TRACECA corridor:
Total costs**

Total "Fixed costs" (US\$)			
	km	US\$/km	total
Poti - Tbilisi	700	0.23	158
Poti - Baku	2000	0.23	450
Tbilisi - Baku	1300	0.23	293
Poti - Yerevan	1100	0.23	253
Total costs			
Poti - Tbilisi			389
Poti - Baku			1,873
Tbilisi - Baku			1,236
Poti - Yerevan			912

It is interesting to see the total costs of road transportation in the corridor. As they do not include the forwarders fee, it can be stated that the actual transportation charges in the corridor are below the actual costs.

The only element of the variable costs that can be squeezed is the driver's net income. Therefore it is a matter of fact that the actual net earnings of the drivers are considerably lower than the values given. This would reduce the actual variable costs, but they would still remain above the US\$ 1,000 level. As far as fixed costs are concerned, it is not necessary in the short run to care about depreciation. This will, however, be changed when the present truck fleet will be replaced and cash

money is needed. In any case it remains a fact that road transport cannot compete in terms of price with rail transport. This applies also in the medium run.

6.1.2.3 The demand situation

It is evident that the marketing strategy and especially the pricing in a market depends heavily on demand. Pricing is one of the main elements to capture an increasing market share in the market for transport services to Central Asia. There is, however, a considerable lack of data on the total volume of demand for transport services to countries in Central Asia, out of which the Logistic Train could derive its market share. Demand figures for containerised transport in the TRACECA corridor are available. For the complete transport volume study, please see section 3.1. They are reviewed here to enable a fast orientation.

6.1.2.3.1 Goods structure and volumes

The following table gives a survey of the forecast on railway transport in the corridor (compare table 3.1.6-16).

Tab. 6.1.2-18: Key data of transport forecasts

	2000			2010		
	Baku Poti	Poti Baku	Poti Yerevan	Baku Poti	Poti Baku	Poti Yerevan
in TEU						
Container traffic by rail (rounded) *						
upper limit (optimistic)	5,000	4,000	4,000	6,200	8,500	9,100
lower limit (pessimistic)	2,800	2,200	2,700	3,400	3,900	3,600
Compare: Baku Port Forecast (containerised traffic in '000 tons)**	350			680		

* without Poti - Tbilisi / Tbilisi - Poti

** HPTI, Tacis Port Baku, Phase 1, Draft Final

This forecast is based on railway shares between 30 and 75 per cent. These shares might be realistic for the longer distance transports. In each case marketing activities should be concentrated on these longer distances. Therefore the forecast for Poti - Tbilisi and v.v. have not been mentioned.

The data can be converted to a traffic volume of 6,000 to 10,000 containers per year for the railway by the year 2000. This means a service frequency between 2 and 4 times a week by assuming varying capacity utilisation (for detailed calculations on that issue compare section 6.6). As the frequency of the service is a clear marketing tool, there should be a clear policy that frequency comes before capacity utilisation.

6.1.2.3.2 Customers attitudes

One of the main problems in demand of transport services with regard to rail are customers attitudes. Customers are producers of goods, but in most cases the real customers are the forwarding/shipping companies as they bear the responsibility to deliver the transport service with regard to producer and buyer.

Due to its monopolistic past the railways have not shown commitment to its customers. This is a fact which not only relates to East European railways. The prevailing customer attitude towards railways can be drastically described as fear and desperation. Only bulk producers with little choice are deliberately choosing railway. This decisive characteristic of demand for the Logistic Train can hardly be overcome by a pricing policy only.

6.1.2.3.3 Medium-term development

The medium-term development in the demand of transport services in the TRACECA corridor will definitely grow strongly. Besides the transit traffic, Azerbaijan imports are one of the main sources for growing transport flows. It is certain that the oil sector will create demand for transport services in various ways. The Logistic Train can gain its market share out of this demand, if several factors as described below are well managed.

6.1.2.4 Tariffs

6.1.2.4.1 Existing railway tariffs

The tariff to be used for the Logistic Train must comply with some basic requirements. It must:

- (1) correspond to laws and regulations in the countries concerned;
- (2) be easy to read and interpret;
- (3) allow flexibility with respect to customers' requirements;
- (4) allow flexibility in dealing with competitors.

The present tariff in the TRACECA countries is still based on the MTT (Meshdunarodnyi Transitnyi Tarif). The basic characteristics of this tariff are:

- distance related;
- different categories of goods;
- degression depending on quantity and distance;
- unit of calculation: Swiss Franc;
- special tariffs for containers.

Today the tariff rates are differing in the TRACECA countries. Recently there has been a meeting of the railways of the CIS states to prepare a new tariff system. This tariff shall be elaborated until 1998.

Among the principles that already have been agreed upon are:

- common regulations for CIS states with a yearly conference for review;
- common tariff base;
- regulation of maximum tariff charges;
- possibility that national railways reduce the charges for their section;
- currency: Swiss Francs or US\$;
- flexible tariff system that enables reactions to other transport tariffs;
- the governments should encourage international transport by reducing tariffs and investing in international railway links.

These principles do not consider developments that might apply to the logistic train in the future, i.e. the railways offer infrastructure to a private company to operate based on leased rolling stock and flexible pricing. At present it is assumed that the regulations will be created between TRACECA countries in the process of EC co-operation projects.

6.1.2.4.2 Tariff recommendations

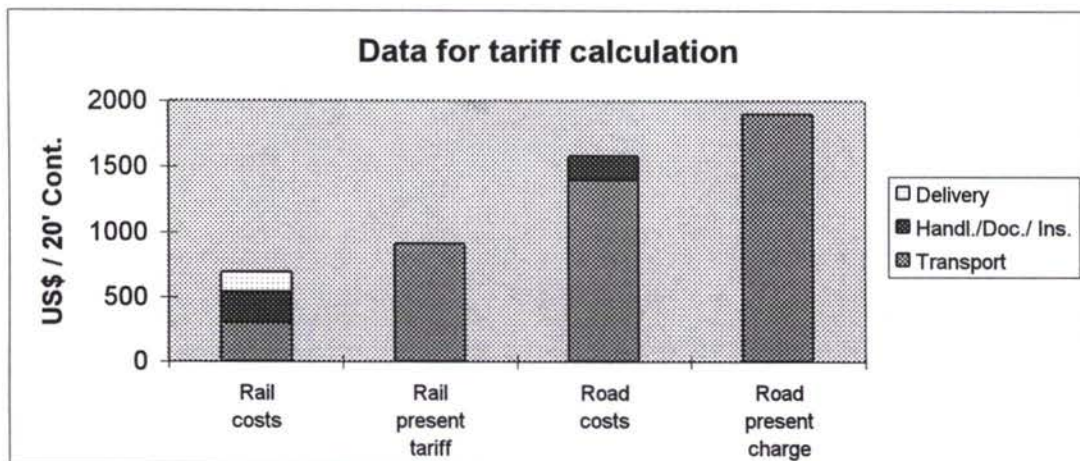
Base data

The following table and figure indicate the base data for the tariff consideration. They are based on the transportation of a 20' container between Poti and Baku.

Tab. 6.1.2-19: Base data for tariff consideration

Item (in US\$)	Transport	Handling/Doc./Ins.	Delivery
Rail costs	300	240	150
Present rail tariff	910		
Road costs	1400	180	0
Present road charge	1900		

Fig. 6.1.2-1: Data for tariff calculation



The table is based on the following:

- as far as costs are concerned, the 'variable costs' form the bottom line of price setting.;
- Handling / Documents / Insurance is cheaper for road transport, as handling costs are lower for trucks;
- delivery costs by road as 'variable costs' for truck/kilometres have been considered to be marginal.

Unit transportation charges

By analysing the data it becomes evident that the variable costs, i.e. the bottom line of road transportation, are considerably higher than those of rail transport. Even the present transportation charges for the Trans-Caucasian Logistic Express are still far below the variable costs of road transport. This means first and foremost that a sound product that satisfies the consumers can bear much higher prices than those actually charged. It must be reiterated, however, that the future product must meet the customers' expectations, and in cases even surpass them.

It is apparent that rail transport still must remain cheaper than road haulage:

- a container or any goods on the truck have their personalised guard;
- fewer personal contacts are involved in the transport chain in road transport
- by definition, there are always two transshipments more involved than in road transport;
- the danger of breakage and delay is greater than with road transport;
- with road haulage, shippers are dealing with smaller entities that can be better negotiated with than an enormous organisation like a railway department.

What is the price that has to be matched? It seems that no truck could regularly run for less than US\$ 1,900. This corresponds roughly to the actual costs. Forwarders have only one possibility to reduce the price: by reducing the net salary of the drivers. This cannot be done for long and this would result in the drivers sparing themselves repairs and, in consequence, frequent breakdowns.

How much cheaper? It seems that 10 per cent is too little as it might not really be accepted as a reduction. So the approach would be to settle for 20 per cent. For simplicity the resulting amount should be rounded. This means that the base price for the tariff setting would be US\$ 1,500 for a 20' container transport through the TRACECA corridor with the empty container returned to the port of origin.

As far as 40' containers are concerned, it is not possible to introduce a surcharge of, say, 50 per cent. The reason is that the truck haulage costs are about the same for both types of containers. This situation will remain in the medium run. Thus only a surcharge of 200 US\$ should be tested. It has to be reiterated that these charges are not cost - but market-related! If road hauliers might begin to differentiate between the two types of containers this would give a competitive edge to the rail transport of the 40' containers.

For palletised general cargo it should be chosen a simple relation to 20' containers. If one ton were taken as one 15th of a container, the charge would come up to 100 US\$ for the Poti- Baku section. This includes unloading as well as FOT delivery and transportation in the special Logistic Train. Of course a minimum transportation weight should be set (10 to 20 tons) and some restrictions placed on goods with low specific weight. (The stipulations of the existing tariff could be used).

The following tariff principles are proposed:

- no goods differentiation (except the usual limitations like explosives, etc.);
- other transport relations are priced according to distance. As flat rates are needed, the distances also should be flattened. The following distance values are proposed (in km):

Poti - Baku	900
Poti - Tbilisi	300
Poti - Yerevan	650

This applies to pure transportation charge and not to the other costs (handling, delivery, etc.) The base transport charge for a 20' container amounts to 1,100 US\$ (rounded), and 1,200 US\$ for 40' containers;

- flat rates;
- door-to-door transport in the corridor is included, and rebates are given to shippers with own delivery trucks.

These principles convert to the following list of transport charges:

Tab. 6.1.2-20: Transportation charges for the Logistic Train (in US\$)

	Poti - Baku	Poti - Tbilisi	Poti - Yerevan
20' Container	1,500	750	1,200
40' Container	1,700	850	1,350
1 ton of general cargo	100	50	80

Considerations on the variation of charges

Some reduction should be given: If the number of containers amounts to an acceptable train load (i.e. 30 to 40 containers) there should be a reduction of at least 20 per cent. The shippers, however, will automatically reclaim this reduction. A variation of the tariff system could be considered in which the base prices are lifted by about another 20 per cent, and the average transport charges are all given a 20 per cent discount with the exception of those months where truck haulage is difficult due to climatic conditions. Such a system, however, is not liked by most of the forwarders interviewed. Still, this does not mean that they would not accept the system *if the product delivery is guaranteed*.

Medium term strategy

The steps to implement the tariff should be carefully planned. It may then take 6 to 12 months to proof the stability of the product using the present introductory tariffs. Only after that period the above transportation charges should be introduced.

Obviously, a joint venture must constantly control the market development. The indicated prices have to be (and can be) lowered when the following developments take place:

- considerable increase in truck speed by improved roads and frontier dispatching which will enable better truck usage;
- considerable savings in road charges for trucks;
- opening of efficiently working rail links to Europe.

Even if the Logistic Train as the future product keeps all the promises made it will be nearly impossible to compete with truly efficient rail links via Chechnya. Even the Kazakhstan link is cheaper than the TRACECA corridor. (It is however not known if the charges of the Kazakhstan link will really be kept at their low level if more goods are being shipped.) All these links are administered by Russian railways in connection with other state railways, and are thus burdened with all problems that these links face as far as the administrative side and the political stability is concerned. If those problems can be overcome, in the eyes of the potential customers the water transport link of the TRACECA corridor access must become considerably cheaper to the combined transport modes to compete successfully.

6.1.3 Conclusions and recommendations on freight transport

6.1.3.1 Freight stations

There is a variety of options available, apart from complete closure, for **non-economic freight stations**, depending upon the individual circumstances and their potential for the future. The principal problems with existing non-economic freight stations can be summarised as follows:

- the market for non-private siding traffic is subject to severe competition from road hauliers, who are able to offer a door-to-door service without transshipment and probably with a shorter overall transit time
- the cost of staffing and servicing freight stations exceeds the revenue generated

How can these disadvantages and problems be reversed and made to a benefit for the Caucasian railways?

The traditional railway freight operation involves two primary interfaces between customer and railway:

- the **private siding**, where a customer (or in some cases the railway) provides a direct connection from an adjacent railway line directly into a factory or other suitable loading/unloading facility. These private sidings typically serve a single customer only and are designed in such a way that there is no requirement for intermediate transfer of traffic using a road vehicle. In many such situations, the loading/unloading facility is arranged in such a way that the rail transport forms an integral part of the industrial production process. Such sidings can vary in size and complexity from a single line capable of holding one wagon to extensive marshalling yards. Private sidings generally lend themselves to the operation of trainload (block) traffic and thus avoid the costs involved in train marshalling.
- the **freight station**, on the other hand, is more akin to a passenger station. It is a general facility provided by the railway essentially for those customers who do not have their own private siding, but who still wish to transport their goods by rail. As can be seen in the analysis, the freight stations very often offer additional facilities, such as storage, road collection and delivery, and cranes, and this usually means that the station is staffed by railway personnel. Traffic dealt with by such stations can be varied, and because the customers' premises may be some distance from the railway, the business tends to be more casual in nature and generally on a smaller scale than is the case with a private siding.

In the future, it can be expected that the balance of traffic levels will increase in favour of private sidings, since they are generally cheaper to operate, and imply a level of commitment to rail business on behalf of the customer. The existence of private sidings normally implies that the level of business has at some time justified the expense of providing a dedicated railway connection, and therefore the level of business should be relatively high.

Freight stations, on the other hand, represent no commitment whatsoever by customers and, indeed, because of the inevitable need for transshipment of freight between road and rail in order to effect collection and/or delivery from and to the customers' premises, there is quite a penalty in both cost and quality of service.

The Consultant's experience with other railways in Western Europe has led to the conclusion that 'traditional' freight traffic through freight stations is **unattractive to customers** where:

- the traffic has to be both **collected** and **delivered** by road or
- traffic has to be **either collected or delivered** by road (there is a private siding at either origin or destination but not both) **and** the rail transport distance is less than 200 km.

The problems of freight stations can be summarised in the following table:

Table 6.1.3-1: Advantages and disadvantages of freight stations

Service	Advantage	Disadvantage
Collection and delivery	none	Requires road transport from customers' premises to freight station and from freight station to customers' premises
Loading and unloading	Potential for intermediate storage if warehouse facilities available	Requires transshipment from road to rail and vice versa
Cost	none	The cost of having to involve road transport and intermediate handling is high
Speed of transit	The availability of empty wagons may be better at freight stations than at private sidings	There will inevitably be an extended transit because of the transshipment
Overall quality of service		Poor: extended transit times, high cost, inconvenience and the increased risk of damage during transshipment

Freight stations need to be very carefully examined individually on their merits to determine their viability in the same way as passenger stations. In general, freight stations are expensive to run and bring little benefit. Such stations in large towns may be viable since they also sometimes fulfil other functions, such as processing consignment notes and collecting revenue from private siding customers, though these functions could and should be streamlined to reduce costs. In general, freight stations in large towns (Tbilisi and Baku, for example) are adjacent to marshalling yards and servicing (i.e., placement and removal of wagons) and can be operated relatively efficiently.

The major area where money can be saved lies in the small, wayside stations which have goods facilities. The majority of these are totally uneconomic, not only when considered as individual cost centres, but also when considering the type of trip-working freight train that is required to service them. Those freight stations with a very low level of business should first be identified. In order to make a quick assessment of the viability of individual freight stations, it is sufficient to compare generated revenue with marginal costs. As mentioned before hopelessly uneconomic freight stations should be closed immediately.

Given that the existing customers are not rail-connected, and that there is little or no prospect of installing such a connection in the present economic climate, alternative technology for **improving transshipment** needs to be considered.

There are a number of different technical solutions to the problem, of which containerisation is probably the most well-established. Unfortunately, the introduction of containerisation on the Caucasian railways in the past has often involved heavy capital expenditure in gantry cranes which are expensive to maintain.

In the context of the viability of individual freight stations, the overall intent must be the improvement of the offer to the customer, combined with a reduction in railways' staff costs. If, at the same time, this can be used as a means of increasing business by imaginative and aggressive marketing, then no time should be lost in implementation.

Staffing at freight stations, whether they are profitable or not, must be rigorously examined. The Caucasian railways can no longer afford the luxury of offering a common-carrier service at every wayside station to whoever may require it.

The optimum (minimum) cost solution is to keep open a freight station, but to eliminate the staff, thus, being able to still maintain train operations. The method of working such stations is to position empty wagons for loading according to notified and specific customer orders only, and to position loaded wagons after the consignee has been advised. This places the responsibility and also, of course, the cost, of loading and unloading upon the customer. This is not different from the situation that exists in private sidings; consignment notes and charging should then

be dealt with by the nearest suitable freight office, or be processed by computer. For low volume stations, this is the only means of retaining the traffic without the attendant costs of staffing. Depending upon the prevailing situation, it will also probably be possible, indeed desirable, to demolish any structures on the site in order to avoid the costs of maintenance.

There are obviously different degrees of destaffing, each depending entirely upon the quantity and quality of the traffic available.

In the following, some theoretical alternatives to complete closure of freight stations will be described. *However, the existing legislation and circumstances have to be taken into consideration carefully:*

Leasing to an Agent - "Privatisation": A general alternative to closure is to consider leasing the entire operation of a freight station to an entrepreneur who would then be responsible not only for the loading, unloading, collection and delivery of the traffic, but also would have an incentive to market the service in his own right in order to increase his throughput and thus his income. Some safeguards would need to be built into such a lease agreement, guaranteeing that all, or at least a substantial percentage, of the traffic using the depot would be consigned by rail. Existing rail staff may be prepared (and should be encouraged) to consider a 'management buy-out' of a freight station on such a basis. However, the viability of continuing to service the station by rail must also be proven before such a step is taken.

Leasing to a Customer: Aggressive freight marketing can often lead to a situation in which a particularly far-sighted customer can see the potential of moving into a new geographical market area, but is unable to locate suitable premises for his operation. Such an example might be a manufacturer of aggregates, cement, oil, steel, etc., who needs to distribute to a range of small-scale customers and needs a 'break-bulk' facility for traffic arriving by block train load in or near a major market centre. A freight station in a good location where adequate land and road access can form an ideal solution, effectively becoming the customer's "shop" in which he is able to store and display his products for sale in the local market. The railways should in such circumstances seek to lease the land and buildings at a freight station for this purpose, again with a suitable clause in the lease that specifies a minimum level of rail business.

The kind of activities typically carried out on such a site are:

- container storage, stuffing and breaking
- groupage and break-bulk operations
- customs formalities for international traffic
- ancillary services such as equipment cleaning, repair and maintenance
- handling, collection, delivery, warehousing, transshipment, etc.

In addition, light industrial processes may also be carried out on the site. The major advantage is that the whole operation is rail-oriented, whilst at the same time involving substantial operational and financial input from the private sector. Normally, the railway's contributions are the land and the rail connection.

6.1.3.2 Operation and marketing

The current freight traffic level of the Caucasian railways is a matter of the greatest concern. Only through well planned and comprehensive action will the railways be able to successfully "relaunch" the freight business. Some of the typical commodities transported in the period before 1989 have not disappeared altogether and will still be transported by the railways in the future, but the quantities will never reach again the high levels of the past. In order to recover at least partly, the railways must target commodities which have replaced the old and must therefore focus on the following characteristics:

Reliability and speed

- national and international freight train timetables
- speed: targets to be set in such a way that services are competitive

Freight wagons

- quality of fleet
- wagon types
- encouragement of private wagon ownership

Freight traffic infrastructure

- inter-modal traffic
- private sidings for door-to-door-services
- future planning, re-opening of the interrupted lines

Marketing and pricing policy¹

- national and international
- before and after-sales service policy
- acquisition
- intensified customer servicing

The railways should be given the freedom to set freight tariffs. Freight tariffs should be confidential between the railway and its customers. If for some reason the Gov-

¹Annex 6.1-6 contains a proposal for a marketing concept to be introduced in freight transport

ernment should impose a price limit for the transport of a strategic commodity on the railway, it should pay to the railway the difference between the imposed price and the price the railway normally would be able to charge (or at least the cost price).

Considering all the facts previously mentioned, it can be assumed that the role of the railway in the environment of the development of a market economy will fairly increase, and it will increase particularly after the political situation in the Caucasian region settles down and the international railway connections to Russia, Turkey, Iran and between the Caucasian countries are reopened.

Depending on the demand, regular freight services adhered to a rigid timetable should be offered. This includes the re-introduction of the rail freight service to

- Turkey via Akhurian and
- Iran via Baku - Osmanly - Dshulfa and Sadarak - Nakhichevan - Dshulfa
- ferry connection Baku - Aktau

The number of freight trains to Russia via Yalama should be increased in line with improved service.

Analysing the results of the Trans-Caucasian Logistic Express Poti -Tbilisi - Baku and the container train link Poti - Tbilisi - Yerevan, additional container trains should be implemented; e.g., to

- Turkey
- Iran
- Russia
- Turkmenistan - Uzbekistan.

The number of formation yards should be adapted to the actual demand. At present, the train formation regulations are established by the Railway Council of the CIS.

Besides implementing the operating programme, the first goal must be to clear main lines of unused wagons. Only then it is worthwhile considering reorganisation and optimisation of shunting operations.

Pre-condition for all these measures is the elimination of the major shortcomings mentioned above and the establishment of an improved marketing campaign.

6.1.3.3 Container transport

The development of container transport is seen as being particularly important to the Caucasian countries. It seems to be the most promising way to successfully 're-launch' the freight business. Alternative technologies for retaining and recapturing lost traffic are described in the following.

Alternative technologies

Alternative technologies for inter-modal traffic now focus on low-cost equipment, of which the following are examples which may be considered suitable for the Caucasian railways:

- High-capacity fork lift trucks, each capable of lifting a fully-loaded container from a freight wagon and placing it on a road vehicle (and vice-versa, of course). Such fork lifts are relatively inexpensive and require no other capital equipment other than a garage and a level working surface. They can be completely operated by one man, who can also complete the transshipment operation by turning the twistlocks on the rail wagons.
- Road vehicles capable of self-loading and discharging, which have to be combined with rail wagons equipped with turntables. This system, developed in Finland, removes the need for any railway staff involvement, other than the train driver who positions the wagons in the goods yard. The truck driver undertakes the entire transshipment operation using the loading and discharging mechanism of the road vehicle.

Each of these have their place in the total transport package marketed by a railway organisation, though it must be noted that there are disadvantages as well as advantages in each. In the context of the viability of individual freight stations, the overall intention must be the improvement of the service to the customer, combined with a reduction in railways' staff costs. If at the same time this can be used as a means of increasing business by imaginative and aggressive marketing, then no time should be lost in implementation.

The recommendations, also given in the framework of the Project "Forwarding - Multi-modal Transport Systems", are related to the following subjects:

- rail operations improvement
- management improvements
- marketing aspects
- improvements at the sea ports

Rail operations improvements

- Definition of a core container network:

The proposed network is presented in section 4.2.5. However, this network should be agreed with regional representatives. Financial aid and support in terms of capital investment should focus on these terminals and on handling equipment and data transmission systems (telephone, facsimile, cargo / container information system).

- Setting up specialised trains with multi-modal traffic:

In terms of long-distance freight forwarding, improvements can result from setting up specialised trains with multi-modal traffic, when the volume of traffic is sufficient. These trains should be organised as shuttle trains departing at fixed times, crossing borders without having to be re-assembled and serving major terminals exclusively, with a minimum of intermediate stops. The Trans-Caucasian Logistic Express and the container train link Tbilisi - Yerevan are the first pilot projects.

- Improvement of container facilities and equipment:

This includes pavement of the storage area, repairs to the cranes and / or purchase of one reach stacker with spreaders for 40' containers per terminal, repairs to access road, lighting and fencing. The measures are presented in detail in section 4.2.5.

- Installation of a cargo / container information system:

In the framework of the project "Pre-investment Study and Pilot Train Baku - Tbilisi - Batumi / Poti" (TNREG 9307), such a system was developed and will be installed step by step. Module B, Annex 1 of the respective Draft Final Report (see "Rationale of the Logistic Information System") contains the analysis of the information service and the concept showing the required information system.

Management improvements

- Re-structuring of the railways' tariff policy:

A restructuring of the railways' tariff policy applied to multi-modal transport is required in order to:

- dissociate railways container tariffs from MTT and CIS tariffs
- create a specific tariff for International Transportation Units (UTI)
- design door-to-door or terminal-to-terminal tariffs
- introduce reduced tariffs encouraging productivity increases (quantity, round-trip fares to facility re-loading, etc.)
- plan payment terms and conditions for customers, compatible with national currency exchange legislation
- transport network costs and market tariffs have to be taken into account

- Establishment of simplified procedures for documentation:

As far as documentation is concerned, SMGS methods and regulations should be improved by setting up simplified procedures between the railways involved. An

active supervision and information method should be developed according to the systems used by certain customers (Western forwarding agents active in this region) with their Western partners and the Russian Railways with their subsidiary companies.

- Establishment of an exchange or joint use pool of container carriage wagons and containers:

The idea of integrating all these technical resources in a centralised management system should be regarded as a medium-term goal.

- Privatisation of terminal management:

The privatisation of terminals should be reviewed to ensure profit margins and possibly participation of private investors in necessary capital investments. The operating companies proposed can also acquire or lease locomotives, wagons, containers and other equipment and facilities.

Improvements at the sea ports

The necessary improvements at the sea ports of Poti and Baku are described in detail in Chapter 7. The construction of a new container terminal at Baku Sea Port is part of the project "Development of the Port of Baku - Port Master Plan".

6.1.3.4 Poti - Tbilisi - Yerevan container train link

Introduction

In the framework of the Taxis/TRACECA project "Pre-investment Study and Pilot Train Baku - Tbilisi - Batumi/Poti" (TNREG 9307), a new container service between the Black and the Caspian sea was developed.

In order to push forward the implementation of the train link Tbilisi - Yerevan with the Trans-Caucasian-Logistic-Express, several discussions were held with the General Managers and officials of both railway departments as well as with forwarding companies. The discussions were based on the investigations and results of the above mentioned Taxis/TRACECA project. The characteristics of the Trans-Caucasian Logistic Express and the general measures of introducing the system are described in detail in this study.

Objectives

The introduction of a weekly logistic express for freight transport in the Poti - Tbilisi - Yerevan relation represents a logic alternative to the transportation of freight and

containers to and from Armenia by road. This train will run as a composite train to the Trans-Caucasian-Logistic-Express between Poti/Batumi - Tbilisi - Baku and have a direct connection to this train in Tbilisi.

The main characteristics are:

- rigid timetable with guaranteed journey times
- agreed tariff rates which are competitive with road transport
- simplified frontier and customs clearance at the Georgian - Armenian border
- guarantee of intact condition of the containers and load
- organised delivery and collection of the containers to and from the terminals
- supply of information
- organised marketing.

The general importance of the logistic express is based on the fact that exporters and forwarding agents in Europe and overseas can build up trust in the transport links to the Caucasus, that the transit time can be calculated more accurately and that they can better organise receipt of payment for the goods delivered. This will improve the willingness to use rail transport to the countries concerned.

Systems characteristic

Timetable

- Proposed timetables as provided by the Georgian and Armenian Railways:

Poti - Tbilisi - Yerevan section

Thursdays:

Departure from Poti at 20:00 (existing timetable)

Fridays:

Arrival in Yerevan at 21:35, Karmir Blur terminal

Saturdays:

Customs clearance and release for delivery to consignee

Yerevan - Tbilisi - Poti section

Mondays:

Departure from Yerevan (Karmir Blur) at 18:50

Wednesdays:

Arrival in Poti at 01:20 (existing timetable); customs clearance and hand over to the port

- Fixing the guaranteed transit time under consideration of the technical conditions of the route (speed restrictions due to condition of track, state of safety and power supply plant, traction equipment)
- Arranging for priority handling of the logistic express train over all other trains

The departure and arrival times are given in full hours for railway customers (ease of remembering).

Tariff rates agreement

Given the current state of economic development in Armenia and Georgia, the agreement on the tariffs to be used is the decisive element for the successful market launch of the logistic express train. The forwarding agents will only dispatch their freight and containers by this train if it offers attractive tariffs. The introductory tariff must fulfil the following requirements as a marketing instrument:

- ⇒ It must be below the general level of rail rates
- ⇒ It must be below the level of road transport rates.

On this basis it was agreed between the Georgian and Armenian Railway administrations to fix the tariff level at 80 % present valid official railway tariff.

Sound condition of freight

The sound condition of the freight is to be safeguarded by escorting the train with armed guards whose duty is to preclude and prevent other persons from interfering with the Logistic-Express. A time-saving procedure is to be agreed upon for the hand-over of the train at the Georgian - Armenian border.

Collection and delivery of freight

The collection and delivery of the wagons and containers at the end points of the route in the least possible time is to be guaranteed by using local technology; the timely provision of road vehicles for the collection and delivery of containers has to be assured.

Supply of information

The customers are to be notified of the freight and containers carried by the logistic express without delay after its departure from Poti/Yerevan. Until a computer-aided information system can be installed, suitable alternative means of communications are to be used, such as telephone or (better) fax, possibly involving a forwarding agent. A further notification regarding collection and delivery is necessary after arrival at the terminal. The notification must contain all the information required by the

customer, such as consignor, consignee, car number, container number, type of freight, departure time, arrival time, etc.

Marketing the train

The logistic express must be available for use by all customers (forwarding agents), i.e., forwarding agents with and without rail involvement. Monopolisation of the train by individual forwarding agents will obstruct the business.

A marketing campaign is to be conducted to market the logistic express; this will inform potential customers in Europe and overseas and in the Trans-Caucasus of the full service offered by logistic express trains. This information includes: departure, arrival and transit times, day of weekly departure and arrival, rates, security, customs procedure and information service. Suitable information media available in Europe and overseas and in the region itself are to be used (newspapers, magazines, radio, television, Internet).

The persons responsible for each item of the measures listed are to be nominated by both sides concerned. A temporary two-party working group is to be set up to reach the necessary agreements.

The Ministries of Transport of both sides are to decide on policy issues and regularly check for fulfilment of responsibilities.

The first train ran

on **27th July 1997** from Karmir Blur (Yerevan) to Tbilisi Usl. with a connection to the Trans-Caucasian Logistic Express to Poti;

on **29th July 1997** from Tbilisi Usl. to Karmir Blur (Yerevan) as a connecting train for the Trans-Caucasian Logistic Express from Poti.

6.1.4 Present conditions on passenger transport

6.1.4.1 General remarks and product definition

In general, passenger traffic can be divided into the following **products or sub-sectors**:

- Short-distance passenger traffic (commuter or suburban service)
- Long-distance passenger traffic (internal, domestic or regional service)
- International traffic

The main distinguishing feature of commuter traffic is that its primary purpose is the transport of commuting workers between their home and place of work. These passengers normally purchase '*abonament*' season tickets.

Depending on the extent of the rail network, long-distance passenger traffic can be sub-divided into domestic service and provincial service. Provincial services are local passenger trains operating on both main and branch lines throughout the country. The market is essentially local, for passengers travelling relatively short distances, or else feeding into domestic services or international service at appropriate interchange stations, and the train services reflect this pattern.

There are three different types of passenger trains:

- Fast trains (express trains) which only stop at main stations
- Ordinary passenger trains (slow trains) calling at all stations
- Electric multiple units (EMU) that also stop at each station

Good quality passenger coaches are in very short supply. Day seating coaches are not available. The existing coaches are not suited for day traffic. For more detailed information see section 1.6.1.

The passenger tariffs are set by the Governments and do not cover the costs of services. There are a lot of concessionary fares. For instance, in Armenia the following persons can use public transport means (excluding taxi) free of charge or at reduced fares:

- Pre-school and school children
- Students and trainees
- One parent of families with five or more children
- Disabled people
- People living in homes for the elderly or children's homes who are supplied by the Government
- "Heroes of Work"
- War veterans
- Member of Parliament and Candidates
- Military personnel
- Non-working pensioners

6.1.4.2 Armenian Railway (ARM)

Passenger traffic dropped from 4.575 million passengers in 1988 to 1.859 million passengers (40 %) in 1996 (see Chapter 3). The transport performance (passenger-km) declined from 417.2 million passenger-km to 84.2 million passenger-km (20 %).

However, there were fluctuations up to 1994. For more detailed information compare section 3.2.2.

As a result of the competition from long-distance bus operators and the cancellation of international traffic, the share of the short-distance traffic increased from 57 % in 1991 to 98 % in 1996 (passengers transported). Due to irregular power supply and very poor condition of traction power supply as well as an energy saving measure, some passenger trains were temporarily cancelled.

In most of the connections, long-distance passenger transport by rail is not able to compete with bus services in terms of journey time, comfort (unheated train coaches, broken windows) and frequency, although bus fares are higher than rail fares. On the other hand, the international railway tariff is much higher than the bus fares. Furthermore, the geographical situation favours bus services on some routes. For instance, the trunk road from Yerevan to Vanadzor is much shorter than the railway line.

The passenger trains were principally used by people with very small income and people who were allowed to travel free of charge or at reduced fares. Therefore, about 50 % of the passengers travelled without paying, either because they were eligible to do so or they avoided to pay the fare. When using the so called special trains, the full fare must be paid. Therefore, the percentage usage has been declined significantly. Since 1990 the passenger tariffs had been increased several times depending on the level of inflation. The present national tariff came into force on 10th February 1997. The CIS passenger tariff for cross-border traffic came into force in 1995.

Apart from the very poor condition of the railway infrastructure that allows only low speed resulting in long journey times, the main problem is the poor condition of the coaches. Furthermore, most of the coaches are sleeping cars that are not suitable for regional traffic (distances between 150 and 300 km). The longest distance in internal passenger traffic is 295 km (Yerevan - Ayrum).

There are only two different types of passenger trains:

- Ordinary passenger trains (slow trains) with a stop at each station (locomotive and 9 coaches with 199 seats)
- Electric multiple units that also stop at each station

Electric multiple units (EMU) serve the short-distance passenger market. The technical condition of the EMU's is also very poor. Although the availability is low, there is no shortage due to the small number of daily train connections.

Similar to national passenger traffic, the circulation of international trains has also decreased. Beginning from June 1997 the only international train in Armenia runs from Yerevan to Tbilisi with a frequency of running alternative days each way. Each

train has 15 to 16 coaches. The total distance is 352 km and the journey time is 12 hours.

Before the break up of the Soviet Union, "international" trains also ran to Moscow (two trains per day each way), Novorossiysk, Sochi, Sukhumi and Baku.

Yerevan is the main passenger station followed by Vanadzor and Gyumri. The number of passengers departing from the main stations in 1996 is presented in Annex 1.4-1.

In March 1997, the passenger timetable included nine trains.

Table 6.1.4-1: Passenger timetable - ARM

No of train	Relation	Remarks	km	Departure	Arrival	Departure	Arrival
662/661	Yerevan- Ayrum	1)	295	10:00	20:00	08:20	18:26
6511/6512	Yerevan- Yeraskh	2)	58	16:30	18:35	07:00	09:06
6530/6531	Razdan- Arabkir	2)	53	06:30	08:30	08:45	10:40
6532/6533	Razdan- Arabkir	2)	53	13:30	15:30	15:45	17:40
6522/6521	Yerevan- Arakhs	2)	59	17:00	18:30	06:50	08:35
6501/6502	Vanadzor-Ayrum	2)	72	07:50	10:36	15:35	18:23
6513/6514	Gyumri-Pemzashen	2)	32	07:10	08:30	08:45	10:05
6515/6516	Gyumri-Pemzashen	2)	32	16:10	17:25	17:35	18:50
683/684	Gyumri-Yerevan	1) 2)	154	08:00	12:40	16:00	20:05

1) running only on alternate days

2) Special trains with specially qualified train crews always assigned to a specific train and with improved service and ticket sale only on the train; no fare reduction is granted.

In addition, there is one train from Armavir to Arshaluis (14 km) and one train from Razdan to Razdan-Mash. These trains are only for the employees of the nuclear power plant and the engineering works, respectively. They are operating every day except Saturdays and Sundays. The management of these factories is charged with an agreed amount for this service independent of the number of passengers.

On the above routes, the number of trains that was circulating in the past was at least three times the current frequency.

Due to stops at every station, the maximum permissible speed of 70 km/h and many temporary and permanent speed restrictions down to 5 km/h, the commercial speed is only approximately 30 km/h.

There is no viability of the passenger service. Considering the fact that passenger traffic has been operated with losses during all the periods of railway operation, the railway strives to cut down the passenger traffic expenditures by means of limiting the number of passenger trains and increasing the revenues. As a consequence,

there has been much discussion in recent months as to the possibility of closing down passenger services completely.

The passenger service is part of the rolling stock department. This means, passenger services do not have any priority within the Armenian Railway. The transformation into an independent production unit "Passenger Service" has been initiated at the beginning of 1997. No marketing activities in order to increase revenues are known; no co-operation with travel agencies exists.

6.1.4.3 Azerbaijan State Railways (AGZD)

Passenger traffic did not decrease as much as freight traffic; it went down by approximately 50 % from 19.6 million passengers in 1989 to 9.0 million passengers in 1995. This reveals that traffic decreased in direct relation to the decrease in the direct real income of the population. The transport performance (passenger-km) declined from 2,041.9 million passenger-km to 791.2 million passenger-km (39 %). In comparison to the other Caucasian railways, the decrease is not so sharp. For more detailed information compare section 3.2.2.

Until 1995, the decline in long-distance and short-distance passenger traffic in terms of number of passengers was nearly the same. On the other hand, the share of short-distance traffic in terms of transport performance (passenger-km) increased from 8.7 % in 1989 to 17.7 % in 1995. International traffic has been mainly influenced by the closure of the railway line to Nakhichevan in 1992 and the temporary interruption of the line to Makhachkala (Russia) due to the Chechnya conflict. In 1996, the number of passengers declined by 50 % in comparison with the year before. The main reason seems to be the low quality of rail transport.

The competition with bus companies has been increasing for some years. The Azerbaijan State Railways is not able to compete, especially in terms of comfort, journey time, frequency and fares. For instance, the journey by bus from Baku to Tbilisi (545 km) takes about 10 hours and by train (fast train with only some stops) 16.5 hours; this corresponds to a travelling speed of 33 km/h by train. According to information received from the railway, the journey time was only nine hours previously. Furthermore, passengers have to pay about 70,000 Manat for the journey by rail and only 14,000 Manat for travelling by bus (November 1996). Approximately 40 % of the rail passengers travel free of charge or at reduced fares.

Apart from the very poor condition of the railway infrastructure that allows only low speeds resulting in long journey times, the main problem in Azerbaijan is also the very poor condition of the coaches. Furthermore, most of the coaches are sleeping cars that are not suitable for regional traffic (distances between 150 and 300 km).

There are three different types of passenger trains:

- Fast trains with stops at main stations only (locomotive and 10 to 15 coaches)
- Ordinary passenger trains (slow train) with a stop at every station (locomotive and 10 to 20 coaches)
- Electric multiple units that also stop at every station

In addition, in 1996 a fast train with improved comfort and higher fare was introduced between Baku and Akstafa (night train, three times per week each way, commercial speed 43 km/h). This can be regarded as a first step to compete with the bus service.

Electric multiple units (EMU) serve the short-distance passenger traffic. The technical condition of the EMU's is also very poor. Although the availability is low, there is no shortage due to the small number of daily train connections.

Similar to the national passenger traffic, the circulation of international trains has also decreased. There are the following international trains:

- Baku - Tbilisi (Georgia) - fast train
- Baku - Moscow
- Baku - Kiev

Before the break up of the Soviet Union, trains also ran to St. Petersburg, Odessa, Yerevan via Dshulfa, Kislovodsk and Norashen (Sharur) via Dshulfa.

Apart from the international trains and the special train to Akstafa, ordinary passenger trains operate on the following routes (March 1997):

- Baku - Gyandsha (two trains per day each way)
- Baku - Agdam
- Baku - Astara
- Baku - Kasakh
- Baku - Belokany
- Baku - Beyuk-Kyassik
- Baku - Goradis
- Baku - Yalama (two trains per day each way)

In total, 13 passenger trains are included in the timetable. Furthermore, there is suburban traffic on the Apsheron peninsula, between Baku and Kasi-Magomed and on the routes Gyandsha - Beyuk-Kyassik and Gyandsha - Udshary.

Baku is the major passenger station followed by Gyandsha.

Due to frequent stops, to the poor condition of the permanent way that is causing many temporary and permanent speed restrictions, to the over-aged rolling stock and overdue maintenance, the commercial speed is only approximately 30 km/h. The maximum possible speed of rolling stock of 120 km/h is achieved nowhere.

6.1.4.4 Georgian Railways (GRZD)

As mentioned in Chapter 3, Georgia had to face up to the sharpest reduction in passenger traffic in comparison with the other Caucasian railways. Passenger traffic dropped from 11.041 million passengers in 1991 to 3.675 million passengers (33 %) in 1995. The transport performance (passenger-km) declined from 2,135 million passenger-km to 371 million passenger-km (17 %). Like in the other CIS-countries, there were fluctuations up to 1994.

As a result of the competition from bus operators and the closure of the line to Russia due to the situation in Abkhazia, the share of international traffic decreased from 9.7 % in 1991 to 0.1 % in 1996 (passengers transported). In the same period, short-distance traffic increased from 56 % to 75 %. However, it can be assumed that there was a change in the classification that also influenced average kilometric performance in the different categories of passenger traffic.

On most of the routes, long-distance passenger transport by rail is not able to compete with bus services in terms of journey time, comfort and frequency. Rail fares were increased between February 1991 and August 1996 sixteen times and are now only slightly lower than the bus fares. However, a journey by fast train from Tbilisi to Poti (312 km) takes about 14 hours; by bus only 7 hours.

It can be assumed that the passenger trains are mainly used by people with a very low income and people who are allowed to travel free of charge or at reduced fares.

In view of the overall condition of the infrastructure, GRZD decided to restrict speeds in general to 40 km/h. Many sections have temporary speed restrictions to 5 km/h. Therefore, the commercial speed of passenger trains is only 25 to 30 km/h.

Apart from this, the main problem in Georgia is also the very poor condition of the coaches. Furthermore, most of the coaches are sleeping cars that are not suitable for regional traffic (distances between 150 and 300 km). The longest distance in internal passenger traffic is 350 km (Tbilisi - Batumi).

According to the present classification, there are the following different types of passenger trains:

- Fast trains which stop only at main stations categorised as main-line trains (distance > 150 km) - locomotive and 12 to 16 coaches

- Ordinary passenger trains (slow train) with a stop at every station categorised as regional trains (distance > 50 km < 150 km) - locomotive and 6 coaches
- Electric multiple units that also stop at every station (distance < 50 km) - four coaches

As a first step to compete with bus services, fast trains with improved comfort, better service and a higher fare were introduced in 1996 (in Russian: "firmenyi poesd").

Electric multiple units (EMU) serve the short-distance passenger traffic. The technical condition of the EMU's is also very poor. Although the availability is low, there is no shortage due to the small number of daily train connections.

Similar to the national passenger traffic, the circulation of international trains has also decreased on the network. There are two international „fast“ trains in operation, between Tbilisi and Baku (Azerbaijan) with a frequency of one train per day each way. The journey time for the 545 km run is 16.5 hours; the commercial speed about 34 km/h. The second train operates between Tbilisi and Yerevan, as mentioned above. Before the break up of the Soviet Union, "international" trains also ran to Moscow, Kiev and other large cities.

In March 1996, the passenger timetable included the following trains:

Table 6.1.4-2: Passenger trains GRZD

Relation	Distance (km)	Category	Number	Remarks
Tbilisi - Baku	545	Fast train	2	
Tbilisi - Sugdidi	317	Fast train	2	incl. 1 Spec. ¹⁾
Tbilisi - Senaki	272	Fast train	1	
Tbilisi - Shindisi	99	Slow train	2	
Tbilisi - Batumi	350	Fast train	2	incl. 1 Spec.
Tbilisi - Borshomi	152	Slow train	2	
Tbilisi - Sadakhlo	66	Slow train	1	
Tbilisi - Kutaisi	221	Fast train	1	alternate days
Tbilisi - Poti	312	Fast train	2	
Tbilisi - Ozurgeti	328	Fast train	2	incl. 1 Spec. ¹⁾
Tbilisi - Akhalkalaki	195	Slow train	1	
Tbilisi - Vale	214	Slow train	1	
Tbilisi - Khashuri	120	Slow train	1	
Tbilisi - Rustavi	25	EMU	2	
Tbilisi - Beyuk-Kyassik	45	EMU	1	
Kutaisi - Satskhere	87	Slow train	2	
Kutaisi - Poti	107	Slow train	1	1 Spec. ¹⁾
Kutaisi - Ingiri	106	Slow train	1	
Zestafoni - Poti	129	Slow train	1	
Khashuri - Zestafoni	63	EMU	2	
Batumi - Kutaisi	145	Slow train	1	
Batumi - Samtredia	106	Slow train	1	

Spec. = Special train (firmenyi poesd)

¹⁾ alternate days

Tbilisi is the main passenger station followed by Samtredia, Khashuri, Batumi, Zestafoni and Gori. The number of passengers for these stations is presented in Annex 1.4-3.

The average load factor of the trains in 1995 was as follows:

- suburban trains (EMU's) 72 %
- regional trains 76 %
- main-line trains 48 %

No train had an occupancy rate of more than 80 %. This means, passenger service meets the demand, but only in quantity.

According to the financial analysis, only 1.4 % of the revenues of GRZD came from passenger traffic in 1996. The degree of cost recovery amounts to only 5 %.

The passenger service department includes also the depots for the coaches as well as the passenger stations and all facilities for passenger traffic. No marketing activities in order to increase revenues are known; no co-operation with travel agencies exists. The efficiency is negatively influenced by the fact that the structure at the regional level is not comparable with the organisational structure at headquarters in Tbilisi.

6.1.4.5 Summary

The main deficiencies can be summarised as follows:

- interrupted international lines
- poor condition of the over-aged coaches, mainly due to overdue periodic maintenance and general overhauls
- non-availability of day seating coaches (The sleeping cars are not-suited for internal and/or day trains.)
- low commercial speed and, as a consequence, long journey times
- frequent interruption of operations
- frequent delays
- low frequency

6.1.5 Passenger market analysis

The passenger traffic forecast (see section 3.2) contains the figures for passenger traffic in different parts of the market. Additionally for selected lines the forecast gives the figures for passenger flows in regional and international traffic from the de-

parture station to the border station/arrival station, i.e. it shows the number of passengers travelling on the individual corridors. Unfortunately there is no information available concerning the main centres of local traffic. Therefore the market analysis was concentrated on the main corridors in international traffic.

Assuming that a night-train has got 360 places and a day train 480 seats and the average rate of occupancy is 60 % it is possible to calculate the number of passenger trains for the main relations:

Table 6.1.5-1: Passenger trains on main lines

Main lines		Number of passengers and trains per day		
		2000	2010	2015
Baku - Tbilisi	10 ³ pass. trains	27 0,3	86 1,1	124 1,6
Baku - Yalama	10 ³ pass. trains	48 0,6	157 2,0	225 2,9
Baku - Gyandsha	10 ³ pass. trains	526 5	1081 10	1223 11,6
Baku - Nakhichevan	10 ³ pass. trains	230 2,1	332 3,4	375 3,7
Tbilisi - Yerevan	10 ³ pass. trains	33 0,4	61 0,8	77 1,0
Tbilisi - Poti	10 ³ pass. trains	152 1,4	278 2,6	355 3,4
Tbilisi - Batumi	10 ³ pass. trains	256 2,4	470 4,5	600 5,7

The above table shows that not even in the future the passenger traffic will reach the volumes, which are typically for the West European countries. Taking into account the number of trains determined, it is not recommended to use fixed cycle operation in the regional long-distance traffic, except for the relation Baku - Gyandsha. The railways' market position in international and domestic long-distance traffic will be considerably improved by using reconstructed, modern passenger cars in regional transport, and air-conditioned, first and second class sleeping cars.

For train numbers below "1" a limitation of service days (service day key) has to be provided. The railway administrations should determine the most appropriate train formation on the basis of line cost accountings.

It is recommended to use lightweight motor vehicles or railway-owned busses in regional traffic with relatively low passenger volumes.

6.1.6 Conclusions and recommendations on passenger transport

There is a number of actions which the management can take in order to improve the viability of passenger services. Some of them are: 'good housekeeping' measures which should be carried out in any case, whilst other measures may be considered as a last resort to avoid outright closure:

Increasing revenue ...

Obviously, viability can be expressed as the function of the two variables cost and revenue. The options for the increasing of the revenue of a line are probably fairly limited, although this does not imply that nothing should be attempted. Any government support in this context should be regarded as revenue support, and has the same effect as increasing fares, but without the consequent disadvantages of reduced demand.

To some extent, the actual rate of occupancy of the trains on a line should be an indicator of the available leeway. If, for example, the services consist of one return trip on the line each day, and the train is overcrowded, this implies that there may be a potential for increasing the number of trains, with possibly fewer coaches (and thus with reduced rolling stock costs), to provide a more comfortable travelling environment which might attract more passengers. If the occupancy rates are low, it is necessary to investigate, if the schedule of the train is optimal and if it meets the needs of the majority of the passengers.

This could determine:

- optimisation of connections with main line trains
- optimisation of connections with local bus services, including situations where the bus service does not serve the station
- identification of opportunities for through ticketing with bus operators to increase the attractiveness of the service.

If there is an irregularity in the train occupancy, i.e. not all trains are uniformly occupied, it is necessary to determine to what extent there are peaks of overcrowding, with other trains, may be in the opposite direction, travelling almost empty. In this case, it may be worth considering the opportunities for some imaginative fare offers, offering 'cheap off-peak return tickets' to encourage optional travel. *However, the present conditions do not call for such measure.*

An investigation of the competition should also be made. Is there a parallel bus route offering a better service or price? If the answer is in the affirmative, it would be more

logical to let the bus operator have all of the traffic, or may be even suitable to buy out the competition.

... and reducing costs

Costs can be significantly decreased by reducing the number of employees. Before this measure can be applied, an analysis should be initiated to determine precisely which function each employee associated with the line actually performs.

Ticket sales can be rationalised by the following alternatives, either alone or in combination:

- **conductor/guard operation:**

Tickets are sold on the trains by a roving conductor, who needs a portable electronic ticket printer. The number of wagons will determine how many conductors are required. The services can be combined with any other on-train service depending on the circumstances. The introduction of return tickets will significantly simplify this task.

- **automatic machines:**

which can also, of course, be installed inside the trains. Tickets would have a time validity from the moment of printing, which would reduce the risk of fraud and simplify spot-checks on trains.

To summarise, the cost-reduction possibilities are:

- **staffing:**

reduction or elimination of staff by introduction of on-train, agency or automated ticket sales

- **infrastructure:**

leasing out or demolition of buildings
reduction in complex and unneeded track layouts
rationalisation of signalling

Compared to the situation before 1990, practically no action has been performed to improve the passenger services. The number of trains has been significantly decreased and the quality has gone from bad to worse. Travel times have been considerably prolonged.

Only by new offers and an improved quality in terms of commercial speed, comfort, reliability, frequency, safety and security the railways will be able to increase their market share.

Passenger services should be divided into the following products:

- Commuter or Suburban Trains (short-distance < 50 km); usually electric multiple units (EMU) and diesel multiple units (DMU)
- Regional Trains calling at all stations (>50 km < 150 km) EMU/DMU
- Regional Express with only stops at main stations (> 50 km, destination within the country)
- Express Trains (International Trains); usually Night Trains
- Special Purpose Trains (firmenye poesda)

A general objective of the railways must be to reach the standards of the better-performing railways of Europe, at least in the international services.

Even though it does not exist an international master agreement between the railways, the important elements of the "European standard" which consist mainly of the following common "quality of service" elements:

- Greater care for passenger comfort in stations (elements of "before" and "after" the journey)
- Higher frequency of trains, ideally at regular intervals, with good connections at nodal points to other complementary services
- Higher cruising speeds
- Easily identifiable product(s) and corporate identity
- Easy ticket purchase and seat reservation for international trains and regional expresses

This will result in an overall intensified care for the customer.

Of course, the measures to be introduced have to be adapted to the special conditions of the railways and the region. In Europe, the increased competition with other modes of transport (private car, aircraft and bus) has proved a powerful incentive to the railways to improve their services.

In future, only the international trains (night trains) should be made up of sleeping and couchette cars. *It may make sense to incorporate day seating coaches (at present, not available) into night trains if a corresponding demand exists.* The train formation of the special trains depends on the purpose.

Therefore, there is an urgent need to purchase day seating coaches for the regional trains and regional express trains. The conversion of sleeping coaches into day seating coaches seems to be an alternative which should be considered.

The following new services have been discussed with the railway representatives concerned:

ARM

- week-end train Yerevan - Shorzha (Lake Sevan), in summer time
- mixed train (goods and passengers) Armavir - Gyumri; in summer time
- international trains to Russia (Novorossiysk, Rostov)
- regional express to Gyumri / Akhurian with connection to Turkey
- international train Yerevan (Nakhichevan) - Dshulfa with connection to Iran
- special purpose train Yerevan - Baku via Nakhichevan

AGZD

- regional train/express Baku - Yalama
- regional train/express Baku - Gyandsha
- regional train/express Baku - Astara
- regional train Express Baku - Nakhichevan

GRZD

- regional express Tbilisi - Batumi; only in summer time
- regional express Tbilisi - Poti
- regional express Tbilisi - Sochi

Table: 6.1.6-.1: Number of passengers and trains per day

	ARM			AGZD			GRZD		
	2000	2010	2015	2000	2010	2015	2000	2010	2015
1) Urban transport (EMU/DMU)									
Mill. Pass/a	1.87	2.33	2.58	3.30	5.37	6.08	1.87	2.45	2.77
Pass/d	5,123								
Pass/h	366	456	505	646	1,051	1,190	366	480	542
Number of trains	2	2	2	3	3	3	2	2	2
2) Regional transport									
Pass 10 ³ /a	42	63	71	1,820	3,746	4,233	1,683	3,084	3,936
Pass 10 ³ /d	115	172	194	4,986	10,250	11,600	4,610	8,449	10,783
trains/d	1	1	1	23	47	54	21	39	50
3) International									
Pass 10 ³ /a	66	136	154	87	283	406	81	166	211
Pass/d	301	630	421	305	1,292	1,854	370	761	963
trains/d	1	2	2	2	6	9	1	2	5

1 year = 5,110 traffic hours in regional transport
 sleeping cars 36 beds/wg à 10 wg
 EMU = 102 seats/wg - 1 train = 4 wagons
 average use of capacity 60 %

Before the implementation of new or improved services, a market research should be performed by ARM, AGZD and GRZD to determine the demand. In Annex 6.1-1 can be found the description of a marketing concept. A simple questionnaire or personal interviews of passengers which use existing services should provide interesting data. The final decision whether regional trains or regional express shall operate has to be made as a result of this market research, too. Table 6.1.6-1 shows the number of passengers and trains per day for the three railways.

Considering the above mentioned facts, the new services should be implemented step by step.

Higher quality should have to be paid by prices which are higher than the currently charged prices. However, the introduction of new or improved services should be accompanied by other improvements. Among these must be far better equipped stations, a "customer friendly" ticket sales and reservation system. It must be possible to simultaneously buy tickets and reserve seats right up to the departure time of the train.

The benefits will be as follows:

- Improved service quality of passenger traffic by availability of actual data for passenger business management and forecasting.
- Possible reduction of the duration of the ticket selling process.
- Flexible and simplified seat reservation, resulting in the sale of seats at marginal prices.
- Possibilities of optimising passenger train timetables and train composition on the basis of the analysis of passenger ticket sales records.
- International electronic ticket sales and reservations will be possible by connecting the system to other railway networks.

A matter of greatest concern is the very low degree of cost recovery in passenger transport. Therefore, there is a need for Public Service Obligation (government bonds) compensation payments to reimburse the Caucasian railways for the provision of unremunerative regional and commuter services. However, the objectives of cost and loss minimisation in the social sectors of passenger traffic should not be interpreted as implying a poor quality of service. A poor quality will certainly accelerate trends to reduced patronage, which will in turn lead to a lower revenue and to higher compensation requirements.

In order to promote rail travel, in particular among incoming tourists, the railways should establish co-operation with tourist organisations. One of the characteristics of such co-operation is that these tourist offices include in their own promotional activities abundant information about the countries' rail services.

6.2 Conclusions for the production of railway infrastructure and rolling stock materials

Parts of the railway's infrastructure and rolling stock offer themselves for being transformed into affiliated enterprises. When creating such enterprises, it must be observed that the alienation of railway assets is interdicted by law in all three states (see chapter 2.1). On the other hand it is possible, however, to establish subsidiaries for tasks such as

- production of materials for the infrastructure
- production of spare parts for wagons and locomotives
- scrapping of old rolling stock
- maintenance of track, signalling and communication systems
- maintenance and renovation of locomotives
- cleansing of station facilities, buildings, coaches or wagons, respectively
- construction and assembly works, e.g. track construction
- repair of station buildings
- planning, projecting, and project management.

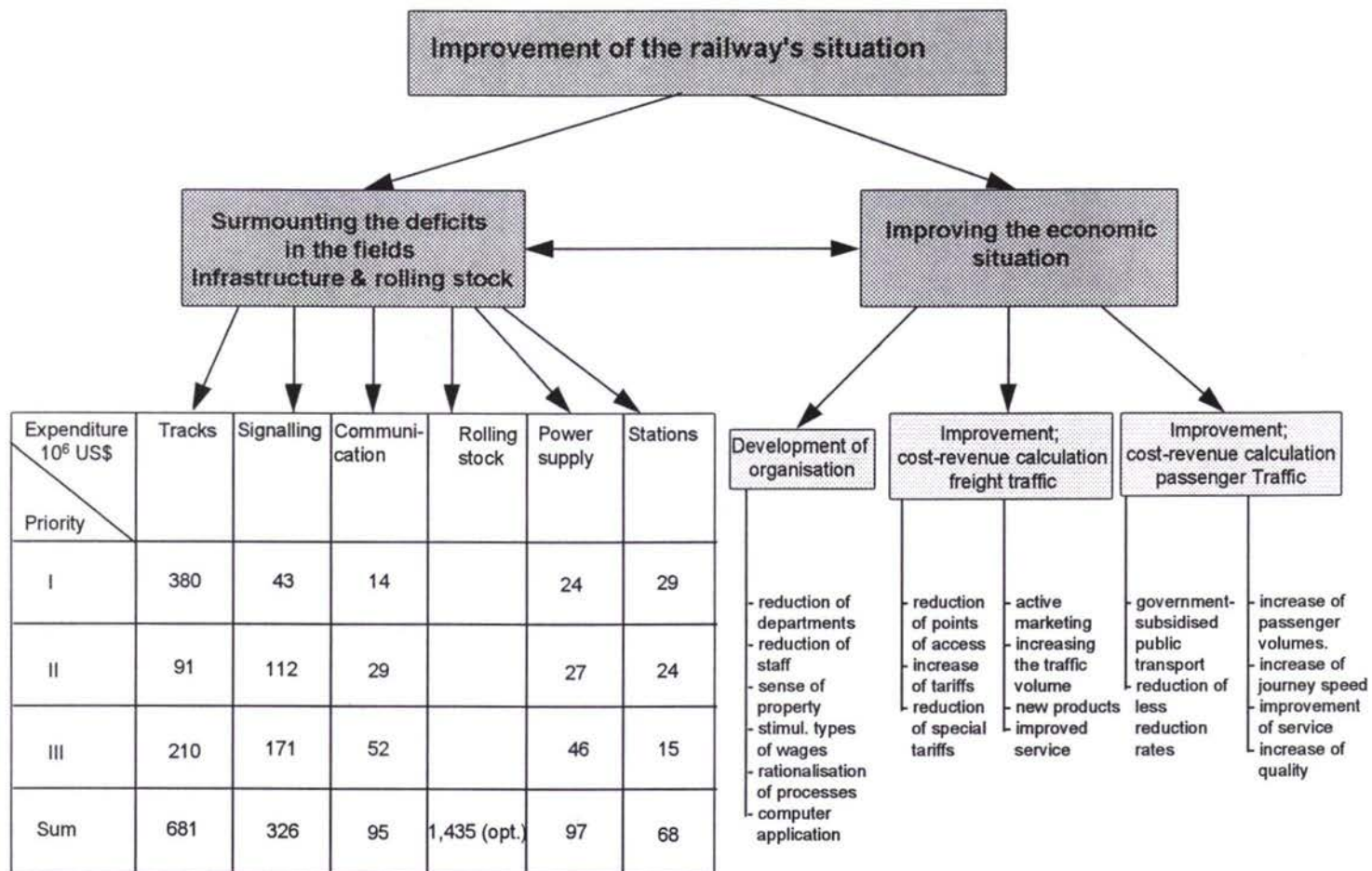
The course of the project and consultations with the final recipients showed that especially in the above fields there is a great need which can neither be satisfied by extensive imports nor by the railway's own capacity. In Soviet times, these matters were uniformly arranged by the MPS (Ministry of Railway Transport), and in the Caucasian states there were no production capacities (exception: locomotive factory at Tbilisi). This need is explained in more detail in chapter 4 - Business Strategy of the Railways.

The diagram to follow below gives a survey of the measures to be necessary for improving the economic situation, and of the investments found to be necessary, classed in three priorities.

Looking at the different fields of infrastructure, the following results can be found:

- the envisaged 1390 km of necessary track renewal as well as the sleepers to be exchanged and the points to be renewed call for a high demand of sleepers, rails, and rail fixtures as well as construction and assembly capacities;
- the bases for renewing the communication system require high planning, projecting, and project management capacities as regards the embedding of 6588 km of light-wave cables with corresponding line terminals PCM equipment;

Figure 6.2-1



the condition of the wagons and coaches requires a lot of repairs (Maintenance programme KR) and spare parts for current maintenance (TR, DR).

- The stepwise installation of a network of container terminals and the effective rehabilitation of the loading, unloading and transfer processes in freight stations and in the ports requires the installation of service points for transshipment equipment where current maintenance and repair works can be done.

6.3 Legal and institutional framework for Joint Ventures

6.3.1 Laws and drafts of laws

6.3.1.1 General

Armenia, Azerbaijan, and Georgia are sovereign states. Their legislation is tied both to their respective constitution and to international treaties. As the international co-operation of the 3 states is underdeveloped, there is plenty of scope for the national legislation because only under the few international treaties referred to above there are limits to the unilateral modification of existing regulations, contracts etc.

In the wake of the 3 Caucasian states' independence the general legislation for enterprises has increasingly become applicable to the railways, too. Therefore, not only the railway legislation must be observed, but also the legislation on enterprises.

For the establishment of an enterprise in the scope of railway infrastructure and for the co-operation between railways and private companies the national laws must be applied. The legislation of the 3 states differ in this question in many details; a juridical unit does not exist any more. Only the basis, the FSU Civil Code, and some agreements in the railway sphere are still valid in all 3 states. In the following paragraphs the juridical situation is presented state by state.

The laws and drafts of laws of the 3 Caucasian states applicable to the activities of enterprises in general and of railways in particular, are the following:

Legislation in the Republic of Armenia

- Law on property (1992),
- Law on enterprises and entrepreneurial activities, dated 14-03-1992,
- Regulation on foreign trade activity, dated 13-02-1993,
- Law on real estates and taxes, dated 27-04-1994,
- Law on foreign investments, dated 31-07-1994,
- Law on privatisation and denationalisation, dated 20-03-1996,
- Law on open and closed companies, dated 30-04-1996,
- Draft of a transport law (1996),
- Draft of a railway law (1997, it may amend the privatisation law),
- Draft of a Civil Code (being prepared),
- Draft of a law on dangerous goods (1997).

The common law of Armenia is to be applied in the fields: industrial safety and work place safety, environmental protection, liability, insurance, purchase, sale and leasing of land, taxes and duties, and border control. The FSU Civil Code is still being applied.

The Armenian law about enterprises provides the following legal forms of enterprises:

- State enterprise (art. 23)
- State enterprise with special significance (art. 24; this is the legal form of ARM at present),
- Stock Company (art. 20) in the forms of an open or a closed Stock Company
- Limited Liability Company (art. 21).
- The further forms of enterprises provided in the law (art. 15 to 19 and 22) are without interest for the foundation of Joint Ventures.

All these enterprises can found affiliated enterprises (art. 25) and joint ventures with other Armenian or foreign enterprises (art. 26). The founding enterprise may contribute state property in these companies, but not as property owned by him (only leasing is admitted). If ARM will be converted to a stock company, then the contribution of assets, and/or activities will not be restricted.

The foundation document (art. 11) must be authenticated by a notary; the founded enterprise must be registered (art. 12). By these reasons, the area of the competence of the joint venture must be concretely defined.

The staff of the ARM are subject to the general legislation applicable to employees of the state.

Legislation in the Republic of Azerbaijan

- Law on entrepreneurial activities, dated 15-02-1992,
- Law on property in the Republic of Azerbaijan, dated 09-11-91,
- Law on the protection of foreign investments, dated 15-01-92
- Law on privatisation of state property, dated 07-01-1993,
- Law on enterprises, dated 01-07-1994,
- Law on Joint stock company, dated 12-07-1994,
- Law on state registration of legal entities, dated 06-02-96,
- Transport law (1997).

The Azerbaijan laws about enterprises and about the Joint Stock Company enable the establishment of companies as legal persons authorised to manage the state property. Hitherto, AGZD has founded numerous affiliated enterprises. In the legal form of a joint stock company only one enterprise with a minority participation of the AGZD has been founded, the AZRAIL. The foundation has been realised in 1994, that means: before the law on enterprises became valid. Since 1995, the AGZD can participate only to joint stock companies whose majority of the shares belongs to the state. Some companies have been founded under consideration of the conditions mentioned above.

The participation of foreign enterprises in such companies is not excluded. For certain activities a licence is demanded according to the special legislation of Azerbaijan.

Legislation in the Republic of Georgia

- Railway Law (1994); an amendment is being prepared which is to permit the legal form of a stock company for GRZD,
- Law on Entrepreneurs dated 28-10-1994, amended in 1996,
- Law on promotion and guarantees of investment activity (amended in 1996),
- Antimonopoly Law dated 25-7-1996,
- Draft of Transport Law (1997),
- Draft of Civil Code (in preparation),
- Draft of a law on estate market dated 9-5-1997.

The common law is applied to railway activities in Azerbaijan and Georgia like in Armenia.

Hitherto, the law about entrepreneurs, dated 28.10.1994, was not applied to the GRZD. Though it admits the foundation of affiliated companies as legal persons to state enterprises (as GRZD). The following legal forms may be taken in consideration:

- The limited liability company (its responsibility is limited to its property; the responsibility of the partners is limited to the amount of their shares) shall have a minimum authorised capital of 1,000 \$ US.
- The stock company shall have a minimum capital of 10,000 \$ US.
- The limited partnership company (commandite company) supposes that the personally liable partners may be only individuals; the commandite partners may be individual or legal persons. The law does not fix the amounts of minimum/maximum shares of the partners.
- State administrations (as GRZD) can found enterprises for entrepreneurial purposes not only in the forms stipulated by this law; but such enterprises must be managed directly by the administrative body (as GRZD). Therefore, such enterprises may not be taken into consideration for Joint Ventures.

Partners of enterprises in these legal forms may be foreign enterprises or investors. The GRZD may contribute railway assets into Limited Liability Companies or into Stock Companies when the majority of the votes is due to the state (resp. the GRZD).

The establishment of a Railway Infrastructure Unit or of a Joint venture is possible from the point of view of the Georgia legislation, when the state (or the GRZD) holds the majority of the shares. The application of this legislation on the foundation of international Joint Ventures would be more favourable than that of Armenia or Azerbaijan because the Georgian legislation has a higher degree of flexibility.

6.3.1.2 Establishment of Joint Ventures

According to the legislation of the 3 states, international companies/joint ventures may be founded as enterprises of private law by railways, shipping companies, port administrations, and/or foreign investors. When it is intended to bring in state property (assets, land) into a company/joint venture, the remarks in section 2.1.3 apply.

The legal basis for such foundations may be:

- either an international treaty between the partner states: in this case the approval (the ratification) by the parliaments of the partner states is required; the by-laws/articles, the management, the activities etc. of the enterprise are to be laid down in the treaty;
- or the national legislation on the foundation of enterprises of one of the partner states; in this case the rules applicable to the activities result directly from the law on enterprises of the state in which the company /joint venture is founded.

The question which national legislation and which legal form to choose mainly depends on:

- the aims of the company/joint venture and of the activities passed to it,
- the extent of the participation of railways as partners (majority or minority),
- the general conditions regarding investments, profits, taxes, financing etc.,
- the possibility to hire staff outside the railway administrations.

These questions are to be examined for every project.

For the foundation of Joint Ventures, the application of the Georgian legislation should have priority

- because it has the highest degree of flexibility, and
- because it seems impossible, at present, to found an enterprise with both ARM and AGZD as partners.

In the 3 states, the foundation of companies/joint ventures in compliance with a national legislation requires that the partner contract and the state registration be attested by a notary according to the respective national legislation.

6.3.1.3 Legal and institutional organisation

The 3 railway entities are integrated enterprises. Therefore, the remarks about the present organisation (section 2.2) are also valid for the participation of a railway in a joint venture. For every project it will be necessary to separate one or more areas, assets, services, and/or activities from the railway entity and bring them in the Joint Venture to be founded.

The separation may be difficult. Personnel, financial and organisational problems will have to be solved. Legally, there will be no other problems than mentioned above, when the Joint Venture is founded by an international treaty or in compliance with a national legislation.

The possibilities for a co-operation of enterprises in the 3 Caucasian states are explained in section 4.5. for Armenia, Azerbaijan and for Georgia.

At present it looks as if the prospects for concluding an international treaty between two or three Caucasian states in the railway field are not good. The ministries and the railway administrations believe that the existing organisation of the international co-operation is sufficient; bilateral conventions could result in a splitting of the legal unity not only as regards the transport law, but also the law on construction and operation. The Consultant presented to the railway administrations a list and description of international conventions concluded by states or governments and valid for the European railways (see Annex 6.3-1). An operating company should be implemented on the basis of the enterprise legislation of one of the Caucasian states. The Georgian legislation would be more favourable than the 2 others. The Joint Venture could be established as a stock company. Additional legislation measures are not necessary. However, the conversion of the state railways in private stock companies would facilitate the foundation of Joint Ventures. The procedures are described in section 4.5. for each individual state.

6.3.1.4 Acquisition, sale and leasing of land and of railway assets

In the FSU land (ground areas, estates) was state property. There was private ownership of mobile objects and immobile assets (e.g. houses), but the ownership of the latter was separated from the ownership of the ground. Since the Caucasian states became independent, private ownership of ground areas has been sustained by legislation. The privatisation laws of the 3 states define, though in each case to a different extent, *which kinds of ground may be converted to private property. Some areas are excluded (so is the land used by the railways).*

Private (individual and legal) persons are now entitled to purchase ground areas from the state. The law does not provide for a conversion from state property to private property which means that at present, purchase is required in any case. Also the 3 Caucasian railways are entitled to buy land from the state or from private owners.

When the legal form of the Caucasian railways will be modified - it is intended to convert them to stock companies - the question will be whether the railways will become owners of the land used by them or not. At present, the railways can use their state-owned land at no cost. However, in Georgia the draft of an estate market law will propose that GRZD pay a rent for the land used by it, once it will be converted to a stock company. In Armenia and in Azerbaijan the envisaged railway stock companies as legal entities shall become owners of their ground areas by way of allocation, as is provided for the mobile and immobile assets (and in Georgia too). The GRZD

should insist that the land used by it is brought in the stock company to be founded; since the paying of a rent would be a heavy burden for GRZD.

The *railways may lease land, mobile and immobile assets* from private owners or from other railways without governmental permission. They may lease the ground areas or assets used by them (and belonging to the state) to private (individual or legal) persons or bring them in any (majority or minority) company.

When a railway buys land, assets or mobile objects it becomes the owner and is free to do as follows: sell it, lease it or bring it in a company. The purchase/sale of land must be authenticated by a notary and registered by the state. The leasing contracts are valid without any specific form being required.

As the privatisation laws of the 3 states cannot be applied to the railways, at present neither the *sale of state property nor it being brought in private companies is allowed* to them. However, it is possible to bring it in a company in the following cases:

- the company is another state enterprise (in the sense of the legislation of the respective state),
- the company is a private enterprise, but the participation (percentage of votes) of the state or the railway, respectively, exceeds 50 per cent.

This restriction is applicable not only to land and immobile assets, but also to mobile ones (e.g. wagons). Therefore, *a railway does not have the right to sell its rolling stock to private companies for them to operate it*. The railway may do so, however, *if the majority of the company in question is owned by the state or the railway, respectively*. The sale of wagons or other objects is permitted when they have been written off (i.e. when they are scrap). The same applies to the workshops for locomotives or wagons, to signalling equipment, etc.

That means: a joint venture to be founded at present, must have a state (or railway) participation of more than 50 %.

When a railway no longer needs ground areas and/or assets, it is obliged to return them to the state or to the respective territorial authority. The competent authority will be defined in each individual case.

When a railway needs additional land, it will receive it, free of charge, from the state or by the municipality. This not being possible (e.g. if the land is private property), the railway may buy the needed areas from the owner(s). If an owner is not willing to sell, the railway may apply for the land being expropriated by a state authority in accordance with the FSU civil code. The railway will have to pay the compensation for such expropriation and becomes the owner of the expropriated land.

These regulations can be applied to joint ventures when their business objectives are acknowledged by the governments as being of public interest:

- ground areas may be left free of charge,
- the joint venture may buy the needed land from the state or from any private owners,
- as an exception, the joint venture has the right to apply for an expropriation.

In these cases legal provisions of the state are applicable in which the ground area is registered.

In Armenia, joint ventures may be founded and get state property for their own use free of charge (e.g. in the case of the gas pipeline running from Russia to Turkey through Armenian territory). This case is a leasing and not a sale of land.

In Azerbaijan, the allocation of state property used by AGZD in a private company is possible with the consent of the Council of Ministers. In these cases the majority of the companies are owned by the state (or the AGZD).

In Georgia, private ownership of land is permitted for the purpose of a entrepreneurial activities to be carried out in the territory of Georgia (see article 1 of the Georgian law on promotion and guarantees of investment activity, amended in 1996).

A special problem under the civil law is the ownership of cable cores. When the railway lays cables in state-owned ground, the cable is state property. When the railway lays cables in privately owned ground, the railway keeps being the owner of the cable. The railway is not obliged to buy the ground in question; but it may do so. An exploitation contract is sufficient.

If some of the cable cores are to be used by another enterprise, a leasing contract may be concluded between the railway and the private user. According to the civil law still valid in the Caucasian states, it is not possible to grant a co-ownership (e.g. 1/8) to the private user. This is a result of the legislation on privatisation. The railway as a stock company would be entitled to grant a co-ownership to any private user. When the railway and the private enterprise buy a cable as joint owners, then they can lay the cable in any ground. In this case, the co-ownership of the two partners continues even if the ground is property of a third party.

The above legal information was given in each of the 3 states; it cannot be verified, though. Without doubt, the railway will be able to create and/or transfer such ownership of the cable cores once it is converted to a stock company. In the new civil codes which are being prepared, these questions shall be regulated.

6.3.1.5 Legal requirements for the activities of a Joint Venture

The result of the entrepreneurial legislation is to be applied. According to the desired aims each project must be checked as to its requirements. The following items deserve attention:

1. No special licence is required when the company/joint venture only wants to buy (e.g. materials for the tracks, for pipelines, for telecommunication), to produce (e.g. concrete sleepers), to build, or to repair the rolling stock.
2. Forwarding enterprises which have to buy railway, ferryboat, shipping or handling services for their customers, do not require a special official approval, either.
3. Enterprises which have to provide telecommunication services must apply for an exemption permit or licence in all 3 states, because telecommunication is a state monopoly, which as yet is not a constituent part of the privatisation laws.
4. When the operating company's/the joint venture's activities are to take place in the seaports, contracts have to be concluded with the port administrations, the railways and the shipping companies. The rules of the FSU are no longer applicable to the seaports in Azerbaijan and Georgia. New legal regulations to replace them as yet have not been developed, which leaves pertinent stipulations to be laid down in the contracts. The contents of these contracts depends on the intended scope of activities of the individual company, and on the responsibilities of the respective port administrations.

The following contractual regulations are in force at present:

1. Node agreement, dated 14-4-1995, between AGZD, Baku Seaport, the Caspian Shipping Company, and the Customs Committee of the Azerbaijan Republic;
2. Node agreement between AGZD and Baku International Seaport, in force since 1-1-1996;
3. Node agreement, dated 7-3-1997, between the Batumi station of GRZD and the seaport of Batumi;
4. Node agreement, dated March 1997, between the Poti station of GRZD and the seaport of Poti.

In the regulations reference is made to the

- rules for the transport of export and import goods via seaports and frontier stations in non-direct international traffic, approved on 22-1-1991,
- rules for the transport of goods in direct combined railway-water traffic,
- rules for the transport of goods in direct multimodal railway-water traffic.

The constitution of the Caspian Shipping Company was drawn up by regulation of the Republic of Azerbaijan dated 6-10-1993.

The Armenian Ministry of Transport leases real estates with rail sidings and landing stages in the seaport of Batumi which are property of the Republic of Georgia. International freight trains shall run directly between Armenian railway stations and these sidings in the seaport of Batumi.

When the operating company/joint venture has to render railway transport services, juristically the following cases have to be distinguished:

1. When the company uses wagons which are not railway-owned (see Annex 10 to SMGS), it is not the company which acts as a railway entrepreneur but the state railways, on whose lines transports are realised.
2. When the company uses wagons and locomotives of its own (or hired or leased rolling stock), then the company is a railway enterprise which produces railway services on a foreign infrastructure. In this case it has to conclude a contract with the state railways which grants the right to use the infrastructures against payment. In this case an amendment to the transport law would be necessary in every Caucasian state.
3. When the company operates the railway jointly with the respective state railways, then both enterprises juristically are railway entrepreneurs. The technical term for this is "operator community". In the legislation of the 3 states there are no provisions for a case like this, therefore an amendment would be required. Between the operating company and the state railway(s) a contract to this effect must be concluded, in which the rights and the obligations of the partners are to be laid down.

6.3.1.6 Activities of an operating company

The legal relations between the company and its customers are based on the civil law, in case the operator is a forwarder like the company "Az-shel-dor-ekspeditzia" of the AGZD, or the Tariff and Forwarding Division in the administration of the GRZD.

"Civil law" means: the civil code of the FSU. New civil laws of the 3 Caucasian states are being prepared but not yet in force.

If the company juristically is a railway enterprise, then the railway transport legislation and conventions valid in the respective state are binding on it.

For inland transports, the respective legal transport system is applied. The ministries of transport are authorised to approve or to reject tariff petitions by the company.

For international transports, the SMGS convention, the MTT tariff and the Enforcement Regulations of OSShD are applicable. For the traffic between CIS countries the former Soviet freight traffic rules are used, which are annually amended by mutual agreement. There is little risk that a ministry imposes a tariff condition on the company in this case.

The international ferry transports between Turkmenistan and Azerbaijan are incorporated into the regulations on international railway traffic according to the treaties dated 13-5-1996. The FSU rules concerning the transport transfers between rail and ferry have been abandoned in the Caucasian ports. These questions are now being regulated by contracts.

The variety of regulations currently in force urgently calls for the development of a legal basis for the relations between an operating company/joint venture on the one hand and state railways, seaports, shipping companies and other means of transport on the other hand. Legal provisions regarding the relations between the transport

enterprises and the customers - as in national and international rail transports - should be created.

When the operating company/joint venture will be founded on the basis of an international treaty, the partner states may grant a lot of special rights (e.g. monopoly positions, exemptions from taxes, duties, customs or border control) to the company.

In case the company will be established in compliance with a national law, then in every respect it is subject to the national legislation (e.g. anti-monopoly law, law on competition). It must enter into competition with other enterprises.

It may be assumed that the 3 Caucasian governments will not grant any special rights to the company/joint venture that surpass the determinations on corridor transports fixed in the treaties of 13-5-1996. They are:

- in the treaty on co-ordination of activities in rail transport:
free transport of goods (para. 2), licences for transport and forwarding services (para. 5), and priority in ferryboat transport (para. 6);
- in the agreement regulating the transit transports:
free transit and exemption from transit fees.

6.3.2 Foundation of affiliated companies

In the three states the railways founded affiliated companies in the legal form of state or private enterprises. Up to now they concern peripheral areas of railway activities only (e.g. schools, social services, etc.). The core of railway activities is not (yet) affected by privatisation measures.

The legislation of the three states gives the possibility to include state property in a private affiliated enterprise. In this case a special decision of the respective government is necessary. In case of insolvency the included state property will not become part of the assets of the company in liquidation. For further information, see section 2.2.4.

6.3.3 Co-operation

An operating company should be established on the basis of a national enterprise legislation with one or two railways and investors as partners. The relations to the railway entities and to the state authorities are important for the activities of such an operating company.

6.3.3.1 The railway transport law; co-operation and international agreements

The term 'railway transport law' means the rules concerning the legal relations between the railway(s) involved in a rail transport on the one hand and the customers (passengers, forwarders, receivers) on the other hand.

To inland rail traffic the respective national railway law and the inland railway tariffs are applicable, and to international transports the international conventions agreed by the Organisation for the Co-operation of Railways (OSShD). In Azerbaijan, since 01-05-1997 the OSShD regulations have been additionally applied to inland transports.

Apart from the OSShD regulations, the decisions of the Council for Rail Transport of the CIS are applied to inland and international rail transports between the CIS member states. The Council decides e.g. on the rules concerning the fastening of goods on wagons, on the rules for the rail transport of dangerous goods, on the tariffs in international passenger transport, on the rules concerning the "own wagons of industry works" (i.e. private wagons; admission and registration of these wagons for all railways of the CIS are incumbent on the Council). The Council was established due to an intergovernmental agreement dated 14-2-/20-3-1992. However, the member states can enforce differing regulations as far as they do not affect the interests of any other member (decision of the Council dated 20-10-1992). All CIS states (also Armenia, Azerbaijan and Georgia) are members of the Council; the 3 Baltic states are associated members.

This means the following for the activities of an Operating Company/Joint Venture:

Applicable to international freight transports between the CIS and between the OSShD states are: the Agreement on International Railway Transport of Goods (SMGS and its annexes 1 to 20), the Uniform Transit Tariff (MTT), the instructions to the SMGS, the Regulation concerning the use of wagons in international rail transport (PPW) and the instructions for accounts in international rail transport of goods. Article 3 SMGS principally guarantees that the railways are obliged to transport all kinds of goods. However, the governments can define exceptions which are binding on the national railways and on the customers. Azerbaijan issued such exemption permits.

Applicable to freight transports between Georgia, Azerbaijan, Turkmenistan and Uzbekistan (in addition to the rules mentioned before) are:

- the treaty of 13-05-1996 on the co-ordination of rail transport activities;
- the agreement of 13-05-1996 on the co-operation in the field of regulating transit transports;
- the agreement of 13-05-1996 on mutual relations in international rail transport,
- the following regulations referred to in the above documents:
the FSU railway law; the regulations on railway operation; the technological relations; the determination of the railways' liability in case of deviations from regular operation; the regulation concerning the acquisition and repair of rolling stock, containers, equipment and technology; the determination of timetables, locomotive circulation, and main routes; the provision of energy for railway enterprises.

These regulations are not binding upon Armenia.

Applicable to all freight transports are also the decisions of the Council for Rail Transport.

In Iran and Turkey it is not the OSShD conventions, but the COTIF conventions that regulate international rail transport. It is assumed, however, that Iran aims at becoming a member of the OSShD. Rail transports between OSShD states and COTIF states are "broken" ones, dispatched at the borders. At present, there are no rail transports between Armenia and Turkey, between Azerbaijan and Iran (except local border traffic at Dshulfa), but between Turkmenistan and Iran.

The provisions of the OSShD and the decisions of the Council for Rail Transport are generally applied. They enable a through traffic of passengers and freight (that means: no broken dispatch, no changing of trains for passengers, no transshipment of goods) between the Caucasian states (exception: between Armenia and Azerbaijan), with other CIS and other member states of the OSShD.

The provisions of the OSShD (including the agreements for international rail transport of passengers and luggage - SMPS, and of goods - SMGS) do not only in their structure but also in their contents correspond in large parts to the Railway Transport Law of the COTIF Convention, which is being applied in all European states west of the CIS, and in some states in North African and the Near East. The COTIF convention includes the CIV (passenger transport) and CIM (freight transport) agreements.

The substance of SMPS corresponds to that of the CIV, and the substance of SMGS to that of the CIM. However, the SMPS do not contain rules on the liability of the railway in case of homicides or injuries to persons (unlike the CIV); Article 46 SMPS in these cases refers to the national legislation. According to Article 18 of the FSU Railway Law of 15-4-1991 the passengers are insured obligatorily. As for the rest, the FSU Civil Code continues to be valid in the 3 Caucasian states (in Armenia and Georgia revised versions of a Civil Code are being prepared). Thus, the Armenian, Azerbaijan and Georgian legislation can modify the liability rules in the passenger transport. The Consultant proposes to make use of that possibility.

The legal situation is similar as regards the transport of goods. The liability rules of the SMGS are far more unfavourable for the customers than those of the CIM. That situation got the firm Scott Wilson Kirkpatrick to draw up a general railway law for the CIS by order of the European Commission. This draft contains special liability rules for rail transport of passengers and goods (project TNREG 9306, Articles 48 to 48 and Articles 50 to 59; RDL.5.E/03.97). This proposal seems impracticable: It cannot be realised generally but only for a national railway, and by a national legislation. If it were to be generally binding for the CIS states, a revision of the liability rules in rail transport would be called for upon unanimous decision of the Council for Rail Transport. In addition, the OSShD could modify Articles 26 to 28 SMGS according to Article 37 and to SMGS. Such a modification, however, could only be reached in the long run. The Consultant therefore proposes to maintain the existing liability rules

just as they are, and to recommend to the forwarders to voluntarily insure their transports.

Once the rail transports between the Caucasian states on the one hand and Iran and Turkey on the other hand will have been resumed, then the Railway Transport Law of the OSSHd respectively the decisions of the Council for Rail Transport will be applied up to the borders. On the other side of the border, the national railway laws of Iran respectively Turkey are valid or - for international transports - the CIV and CIM agreements. The Consultants recommend the Caucasian states join the COTIF once the borders are open, and apply the CIV/CIM in addition to the SMPS/SMGS. Turkmenistan is considering to do so in view of the new rail connection opened in 1996 to the COTIF state Iran.

6.3.3.2 The railway construction and operation law

These rules concern the legal relations between the railways on the one hand and the control and supervisory authorities of the state on the other hand. They comprise the technical instructions to be observed when constructing railway assets and vehicles and in railway operation. At present, these instructions are laid down in numerous leaflets based on the FSU railway law. In accordance with the decisions of the Council for Rail Transport they keep being applied by the railways of the c.c.s. and of the 3 Baltic states. The Council for Rail Transport, for instance, in 1996 unanimously adopted the "Rules for Rail Transport of Dangerous Goods", now in force for the railways in the CIS and in the Baltic states.

Since 1996, AGZD and ARM have been associated members of the International Railway Union (UIC). GRZD also considers joining it. A few copies of the UIC recommendations have made their way to Baku and Yerevan, though at present, they are not being observed by the railways. Most of the UIC publications - especially the "binding recommendations" - are not available in the Caucasus, and none of them has as yet been translated into the national languages. A competition of the UIC rules with the FSU' rules should be avoided. Apart from the 2 Caucasian railways, of the CIS railways only those of Ukraine, Belarus and Moldova are UIC members, and the Turkmenistan railway is an associated member. Unfortunately the Council for Rail Transport is not in a position to enforce the application of the UIC rules, and the different railways (or governments) will certainly decide differently from each other as regards this subject.

In addition, there is the risk that the national lawmakers in the parliaments or in the ministries enforce general rules applicable to engineering, equipment, environmental protection, industrial safety, etc. that differ from the decisions of the Council for Rail Transport (i.e. the FSU publications versus UIC publications). In fact, the introduction of differing rules is permitted if they leave untouched the interests of other CIS railways.

The Armenian government - and ARM will follow - is of the opinion that, since Armenia has a railway legislation and supervision of its own, the decisions of the Council

for Rail Transport and of other international organisations legally speaking are of recommending character only. These decisions will have to be converted into Armenian legal or administrative regulations. For instance, Armenia does not accept the rules on admission and registration of privately owned wagons established by the Council for Rail Transport; and introduced a wagon registration of its own. Or: Armenia does not apply the rules for rail transport of dangerous goods, but drafted an Armenian law to this effect. Armenia as a sovereign state is entitled to refuse the application of any international decision. Only in cases in which the Armenian government explicitly agreed to a decision of the Council for Rail Transport or of another international organisation, it will be applied in Armenia.

The draft of the amendment to the Georgian railway law provides that international conventions concerning the railway must no longer be concluded by GRZD, but by the Georgian Ministry of Transport. That means: in Georgia, too, the decisions of international organisations will have to be converted into national (legal or administrative) regulations. It should once again be stressed that the decisions of the Council for Rail Transport have no final and binding effect for the national CIS parliaments, since this Council was not created due to an international treaty, but by a common meeting of the heads of the governments of the CIS states.

In order to avoid dangers to the safety of rail transports, the Joint Venture should insist on agreements in those cases where international conventions or decisions are not being applied. These agreements should comprise all railway enterprises or railway administrations whose network or interests would be touched by the activities of the Joint Venture. These agreements should clearly state the rights and obligations of the partners to these agreements, and their validity should be a long-term one. They should also provide for the case that any of the legislation of the countries under the respective agreement should be altered. It would be advantageous if the stipulations of these arrangements would be backed up officially by the states involved by means of treaties, or, this not being possible, by means of the respective Ministry of Transport's approval.

6.4 Joint Venture scenarios and evaluation

6.4.1 Introduction

The evaluation of different management strategies and types of ownership (in short strategies) as the basis for setting up the service and infrastructure companies requires a methodical/methodological framework which can be applied irrespective of the particular project.

The methodology can, therefore, only show the most important criteria used for evaluation, and this in turn means that completion, extension or reduction are possible and even necessary depending on the type, magnitude and specific details of the project(s) concerned.

6.4.2 Methodology

This methodology has been developed mainly in respect with the preliminary selection of potential scenarios as the basis for their further analysis (compare procedure model in Annex 6.4-1).

Within the framework of this methodology, 'scenario' means the possible course of action intended to lead to the foundation of enterprises or signing of contracts for co-operation.

The selection of scenarios intended for analysis and possibly the foundation of a future Joint Venture is carried out in four steps:

1. Definition of the criteria of investigation
2. Investigation of the selected specific fields
3. Preliminary selection of potential scenarios
4. Evaluation of potential scenarios

The analysis is also carried out in four steps:

5. Setting of goals for the scenarios
6. Analysis of real possibilities and conditions
7. Derivation of partial strategies for the scenarios
8. Development of a complete strategy including consistency and plausibility tests

1 Definition of investigation criteria

The investigation criteria are based on the main points contained of the preliminary selection. These are globally formulated and oriented to economic macro values or technical and technological developments.

Common national economic and transport economic criteria:

- added value (increase of GDP)
- creation and securing of working places
- use of available domestic resources
- reproduction and extension of the infrastructure
- efficient means of communication between industrial centres
- links to international markets
- a potential increase in export trade
- greater independence from the traditional trade partners
- forecast for freight transport - import, transit, export
- forecast for the freight structure
- forecast for the passenger traffic
- increasing the efficiency of the main branches of domestic industry
- the emergence and development of new industries
- acceleration of restructuring of the economy
- demography

Industrial economic criteria

- location of the existing infrastructure
- economic evaluation of machinery and technologies
- qualification of personnel

Technical and technological criteria

- tracks : superstructure, substructure, bridges, tunnels
- rolling stock : locomotives, wagons
- operation : organisation, management, EDP

2 Investigation of selected special fields

The research into the selected fields specified in the terms of reference is carried out on the basis of the criteria established which are based on

- preliminary studies and results of the previous EU - projects
- discussions and workshops with the final recipients
- discussions and workshops with national and international experts in special fields: economy, traffic, law and taxation
- results of the investigations of this project
- knowledge and experience of similar projects in other countries of Eastern Europe.

The result of these investigations was the ability to evaluate the respective general situations on the basis of a knowledge of the concrete situations and volumes of demand.

3 Preliminary selection of potential scenarios

The investigations of the special fields enable the derivation of a number of possible scenarios which could be analysed in detail according to their significance

- for the complete process of transport
- for the transport accompanying or preparing processes
- for definite branches .

They are grouped according to the special fields, the economic and financial feasibility, and the necessity of the implementation.

4 Evaluation and selection of scenarios

At this point the choice and evaluation of potential scenarios are made taking into account the existing results of the forecasts as well as talks with the final recipients and experts. The results of the investigations so far and standpoints of the parties - which influence the final results of the evaluation by one third each were specified and agreed in discussions and workshops in the course of the project.

The transparency and comparison of the results were presented in complete estimation of the respective development and demand values. Every individual evaluation was pooled by using average values to one partial evaluation. Every partial evaluation produces on an average the complete evaluation.

++ short-term necessary (1st priority)

Evaluated like this, a scenario needs urgent work as, proceeding from different standpoints (national economy, industrial economy, transport economy, technical and technological) the development and demand values require a short-term realisation. The scenarios marked like this will be analysed within this project.

+ medium-term necessary (2nd priority)

This evaluation relates to the potential scenarios, which are of partial interest for the final recipients and experts in general or of great interest from a certain standpoint.

○ short- and medium-term non-necessary

Scenarios evaluated like this are not to be studied in a short time or medium-term period due to the lack of demand (in terms of national economy and transport branch economy) for their study and realisation within this time period or because no economically relevant effects can be produced through their implementation.

- not or hardly necessary

The further study of scenarios evaluated like this is not or hardly necessary due to lack of demand (in terms of national economy and transport branch economy) for

their study and realisation or because no economic effects can be produced through their implementation at all.

The evaluation is done considering the country's peculiarities and irrespective of the future

- location
- Joint Venture- and/or technology partner and
- form of implementation

taking into account

- cost / benefit aspects
- investment volume
- national locations, peculiarities, and requirements.

The evaluation of the potential scenarios for the fields of infrastructure and rolling stock as well as operating and service on the basis of relevant facts and reasons is presented below. Only those scenarios are presented which received a mark «short-term necessary» in the complete evaluation. These scenarios are analysed in detail within the scenario analysis.

Scenarios which should be realised within the medium-term period are not a subject of further investigations within this project.

5 Setting of goal directions

The foundation and operation of Joint Venture(s) in the fields of infrastructure and transport (service company(s)) are realised by setting various goals of the participants. The task at this stage is to sum up, classify and evaluate these goals.

The following major directions for goal setting are to be distinguished:

- political (interior- / foreign policy, national / international)
- economical (national economic, transport economic and industrial policy)
- technological (production / transport / communication and technology)
- others (other verbal goals).

Those goal directions can also be subdivided, if necessary, so that it is possible to make a detailed description of different goals and derivatives of goal values. Every separate goal direction is to be weighed considering their relevance to achievement of a complete goal.

The cross section of separate goal directions has special significance for the foundation and location of a respective company.

Through a well-timed goal direction setting, mutual goals as well as conflicts of goals between the participants can be revealed.

6 Analysis of real possibilities and conditions

Based on the goal directions and derived individual goals, the given scenarios are investigated in terms of their real feasibility on the grounds of the existing possibilities and conditions, and the results of already conducted technical and economical studies related to the project.

This analysis forms the basis for comparison of the present state with the set goal directions and the following derivation of partial strategies.

The analysis groups are structured in conformity with the goal directions.

As an example for the preparation of partial analysis is a study of possible enterprise forms for joint venture(s) in the fields of infrastructure and transport (service company(s)) presented in Annex 6.4-3. The shown results of the study are valid for all scenarios.

Proceeding from the legal/juridical, economic, financial and technical grounds, it is possible to specify in detail the main points of investigation presented in the part «Ownership strategy - Enterprise form».

7 Derivation of partial strategies for the scenarios

Statements on the individual partial strategies can be derived from the comparison of the goal directions and the real possibilities and conditions.

The term «partial strategy» embraces the determination of all business decisions necessary for the foundation and operation of joint venture(s) in the fields of infrastructure and transport (service company(s)). Those decisions are concerned with:

- general frame conditions
- business goals
- business tasks
- management forms
- enterprise forms
- participants
- financing
- organisation
- interfaces with the railways.

Partial strategies, which meet the set "Must-Goals", are to be derived in the first place. The "Must-Goals" (also considered as technical and economical planned-tasks) and the partial strategies are to be permanently agreed with.

The primary setting of partial strategies as "Must-Goals" enables the short-term development of complete strategy points to one of the selected scenarios. Individual partial strategies should be evaluated by the participants according to their importance in order to determine priorities (compare Annex 6.4-4)

The management and ownership strategies have central importance for the foundation of the enterprises within the framework of the partial strategy.

Various management and ownership strategies are presented and evaluated in relation to the scenarios together with their advantages and disadvantages.

8 Comparison of the complete strategy and consistency-/plausibility test

Based on the developed partial strategy, the complete strategy is to be derived, and consistency and plausibility are to be tested. The consistency and plausibility test is always done between the partial strategies.

The evaluation of the individual partial strategies is done iteratively, that is, already in the draft stage of the partial strategy, every component is to be studied and evaluated in terms of its feasibility and plausibility. The consistency and plausibility test within the complete strategy also implies a permanent evaluation of its points in comparison with the worked out goal directions.

6.4.3 Recommendations

Applying the steps 1 and 2 described in the procedure model, a preliminary selection of the following potential scenarios was done :

Field of Infrastructure

- production of spare parts for the superstructure
- sleeper plant
- telecommunication
- signalling equipment
- maintenance and repair services for non-core activities of the railway

Rolling stock / work shop

- production of spare parts for transport facilities
- maintenance, repair and reconstruction of E-locomotives
- maintenance, repair and reconstruction of Diesel-locomotives
- repair of wagons and tank wagons
- cleaning of tank wagons, freight wagons and passenger coaches
- building of special wagons

Field of service

- Sales /Marketing (Operation) of multimodal and combined transport facilities in the field of container traffic on main lines
- Sales/Marketing (Operation) of multimodal and combined transport facilities in the field of parcel freight traffic on main lines
- Sales/Marketing (Operation) of transport facilities for oil products
- Sales/Marketing of services in passenger traffic (interurban traffic on main lines and urban traffic in industrial centres)
- Marketing for other transport services and extension of the range of services of the railway
- Development and sales/marketing of information technologies (for example, process automatisation, information systems)
- Leasing of wagons, tank wagons, special wagons (refrigerator wagons) and containers
- Leasing of communication services.

The evaluation of the above mentioned scenarios, taking into account the conditions in the different countries concerned, is shown in Annex 6.4-2.

As a result the following scenarios were selected for further investigation :

1. Sleeper plant,
2. Telecommunication,
3. Repair, maintenance and reconstruction of electrical locomotives
4. Sales/marketing (operation) of multimodal and combined transports in the field of container traffic on main lines.

The following reasons were primarily responsible for the selection of the above mentioned scenarios:

Sleeper Plant

- access to domestic raw materials and production capacities
- condition of the railway tracks network (especially superstructure)
- backlog of maintenance and repair works
- improvement of the traffic security on main lines
- technological lack of know how for sleeper production
- dependence on imports
- high import prices
- possibilities to reduce maintenance and repair costs for the railways

Telecommunication

- precondition for the re-establishment of full security of operation and traffic for the railway transports on main lines
- strategic significance for the whole national economy under the simultaneous use by third parties
- basis for the introduction and use of modern information technologies
- basic precondition for the introduction of new transport technologies
- measures for the increase of the competitiveness of the railway against other transport modes

Maintenance and reconstruction of electric locomotives

- no adequate repair capacities in the entire region
- reduction of costs for repair and modernisation
- modernisation of the locomotives and thus increase of the operation and traffic security
- independence of repair capacities in other regions
- reduction of energy consumption
- increase of service quality and availability
- creation of operative reserves for railway operation

Operating enterprises of multimodal and combined transports in the field of container traffic on main lines

- application of future oriented and modern transport technologies
- creation of a competitive offer for services involving the railways and other participants of transports
- creation of competitive transport corridors for the connection of central economic industry areas (Europe-Asia)
- catalyst for the increase of the transport volumes of railways and thus
- precondition for the profitability of the planned infrastructure measures by increasing the revenues for the railways.

The investigated scenario for «Sales/marketing of multimodal transports for oil products», which received a short - term 1st priority and therefore needs a short-term analysis and realisation as well, has *not* been studied under this project due to the following reasons:

- relatively small mining quantities of oil at present
- uncertain time conditions for the production increase (vague and hesitating statements of the oil consortium AIOC)
- limited circle of possible customers for a possible operating enterprise
- practically no alternative to the railway (only seasonal competition of inland waterway) and thus
- a limited effect for the railway (presently already app. 65% of transport volume).

6.4.4 Financing sources

The foundation of joint ventures in the field of infrastructure, rolling stock and service operation is a clear step towards private sector activities. Therefore the question of financing sources addresses a larger field of activities and has a higher degree of flexibility. Focal points for financing are

1. Equity financing by shareholders
2. Loan financing by donor agencies
3. Loan financing by commercial banks
4. Supplier participation through BOT or BOLT
5. Co-financing
6. Venture capital financing
7. Guarantee stand-by support from donor agencies or international banks

The evaluation and selection of the respective financing instrument heavily depends on the organisational type and shareholder structure of the joint venture as well as on its foundation status. Within the scope of this Study, the four selected possible joint ventures (see section 6.4.3) have only achieved a scenario status. Therefore the question of financing can only be addressed from a general point of view. Detailed financial analysis with clearly defined contributions by the respective partners for each joint venture will be a necessary follow-up procedure outside the scope of this Study.

Taking the present status of the four selected joint ventures into consideration, many different national and international financing institutions are able to participate in the financing of joint ventures. The following financing organisations and institutions have been selected and interviewed:

- 1 KfW - Kreditanstalt fuer Wiederaufbau, Frankfurt/Main, Germany
- 2 DEG - Deutsche Investitions- und Entwicklungsgesellschaft mbH, Cologne, Germany
- 3 EBRD - European Bank for Reconstruction and Development, London, UK
- 4 Private industry and service organisations

General overview of the main results:

As prerequisites for all financing sources as mentioned above were considered

- privatisation and commercialisation strategy
- foreign (western) joint venture partner involvement
- stabilised financial performance by the joint venture
- independent accountability and responsibility of the joint venture

The general attitude of each of the above mentioned institutions can be described as follows:

ad 1: Aside from the financial cooperation programme (FZ programme) for which the initiative has to come officially from each partner country resp. government to be put on the agenda for the bilateral talks, KfW can offer commercial credits in combination with HERMES guarantees (state guarantees for the supplier) through its Export Credit Department.

ad 2: DEG as the fully state-owned German investment bank finances projects for

- subsidiaries of German enterprises established abroad

- joint ventures between German and local partners

The financing programmes contain loan financing as well as equity financing. In addition DEG also finances local banks, venture capital funds, leasing companies and special credit institutes in the respective countries. The conditions are related to the capital markets. Especially joint ventures have been major beneficiaries of DEG's lending. The financial volumes are located in the range of DM 3 million to DM 20 million. But one of the key requirements to address such a financial programme is the fact that the foundation of the joint venture must be fully completed. With reference to the four selected joint ventures of this Study, DEG is interested to start the appraisal once the joint ventures are fully established.

ad 3: Joint ventures financing can become part of the financial initiative already taken by EBRD with respect to infrastructure for railways and ports in Georgia and Azerbaijan (see chapter 4.4.2). This is subject for further development and discussions.

ad 4: For all four joint ventures, private industry partners have been approached. The response was positive and a serious interest for financial engagements has been confirmed. But a linkage between financial investment and shareholder position has been required, i.e. the financial contribution to each individual joint venture must be reflected by the percentage of shares of the joint venture. Most of the interested partners required a shareholder position of 51 % and more.

6.5 Foundation of joint ventures in the infrastructure and rolling stock field

6.5.1 Concrete sleeper production

6.5.1.1 Management and ownership strategy

6.5.1.1.1 General

The results of the study stated in the sections 1.1 and 4.2.1 reveal the relevant demand for new sleepers for rehabilitation and maintenance of the railway network of the three Caucasian republics, thus justifying the creation of local sleeper production.

Considering the results of the demand analysis (see section 1.1) and the optimum operation values (output of approximately 200,000 sleepers a year per plant), one should assume two consumer markets: Azerbaijan (the East supply area) and Armenia/Georgia (the West supply area). Annex 6.5.1 contains the results of the detailed analysis of possible locations for the concrete sleeper production. More than two factories are economically not viable.

The location of the sleeper production in Dollyar and Tbilisi has been recommended, particularly, due to the given geographic and economic preconditions. This reflects the main idea about mutually beneficial economic co-operation in the whole region, but is contrary to the intention of each of three countries to have her own factory. A detailed study with respect to a suitable location in Armenia could not be carried out, as the needed data had not been given despite numerous demands from the consultants.

For the entire area the creation of a sleeper production of the Type DSA, irrespective of the implementation form, is recommended due to the following reasons:

technical and technological

- due to the a technology, the life time will increase from 15 to 25 years on an average, thus decreasing maintenance costs;
- the high quality of the European prestressed concrete sleepers (DSA Type) and the new W-fastening technology significantly reduce the maintenance costs;
- 10% reduction of sleepers per kilometre will be needed due to increased distance between two individual sleepers, thus reducing investment costs per kilometre;

economical

- the expected total production costs per sleeper will be lower than the actual purchasing price, which is approximately 50-60 US\$ (incl. fastening)
- investment volume is acceptable compared to the countries' economy

- short construction time (approximately 9 months)
- high value added rate in the region
- availability of transport intensive production materials
- equally determined and, thus, to a great extent secured sales based on state purchasing guaranties or purchasing guaranties of the railways under conditions of compliance with the quality standards and competitive prices
- secured planning and permanent utilisation of production capacities.

As to the financing, the state purchasing guaranties and the purchasing guaranties of the railways are of special importance.

The concrete sleeper plants' major or sole customers are the national railway companies. The production will find only limited use as an export product.

Due to considerable weight and low value of the sleepers, they should not be transported over great distances for economic reasons. The location of the sleeper production must lie in the centre of a demand area.

Other national users of rails (for example connecting links of railways) and the neighbour countries (for example Turkmenistan and Kazakhstan) seem to be interesting as additional customers. Thus, the sleeper production is of rather local importance.

The following characteristics of a potential Joint Venture are described irrespective of the future location of the sleeper production:

6.5.1.1.2 Business goals

The selection of an ownership strategy must be based on the study of the future company's goals and tasks in the field of the sleeper production:

1. Short and medium term business goals

Related to quality

- supplying the actual demand for sleepers, especially, on the main lines and, thus, securing a reliable and high-quality transport route;
- use of a modern technology (DSA-System, W - fastening);
- independence from the sleeper imports from abroad, particularly, those from Russia and Ukraine which already have a well-known inferior quality;
- main supplier for the railway administrations in the Caucasus and other national purchasers and later on for the neighbouring countries as well;
- profit earning only in order to maintain the substance level of the production sites (simple and extended reproduction).

Related to quantity

demand for sleepers per year	ARM	75 - 83,000
	AGZD	180 - 250,000
	GRZD	130 - 200,000

(Figures given by the railways according to Annex 6.5-6)

This leads to a total demand of 533,000 sleepers per year for the whole region.

- profit margin : app. 5 - 7 % of sales
- decrease of costs against the imports : app. 20 %

These goals are determined by the potential participants and depending on the interests specified as "Must-Goals" or "Can-Goals" (compare Annex 6.5-2).

2. Long term business goals

- full supply of the actual demand of the national railway companies
- fulfilment of the demand of other national customers for sleepers (ports, industrial railways, tramways)
- possible export to neighbouring countries with broad gauge railway network

6.5.1.1.3 Management strategies

Three possible management strategies for the creation of an enterprise for sleeper production have been studied which could be applied, depending on the specific character of the investigated region.

1. Enterprises without participation of foreign technology partners
2. BOT mode (Build - Operate - Transfer)
3. Enterprises with participation of foreign technology partners

These management methods contain the following actions:

1. Enterprises without participation of foreign technology partners

This method of management implies that individual railway administrations found a sleeper production plant by themselves as founders and/or involving national enterprises, and realise planning, implementation and production introduction.

Foreign technology partners, i.e. enterprises with extensive experience in the complete technology or in partial technologies of the sleeper production (creation and operation of sleeper production plants) will not be integrated in this company .

Basing on their requirements (terms of reference), the railway administrations which intend to found the sleeper production plant, entrust an engineering office (consultants) with the tender for construction of a sleeper production plant.

The tender documents should be worked out in close collaboration between the corresponding departments of the railways and the entrusted consultants. The most appropriate form of collaboration between the participating experts is to be selected already on this early planning stage in order to be able to settle all related issues in time.

The following results should be obtained within the first stage of the project:

Technical specifications

- customer's requirements to the technical and construction facilities
- capacity (possible capacity fluctuations, gradual improvement)
- technology
- security
- standardisation
- service
- requirements to the quality of the semi-finished and finished products
- requirements to the form and volume of the order processing

Concept for the company with regard to

- the enterprise form / ownership strategy
- investment planning
- profitability planning
- turn over planning

In the 2nd stage, the foundation of the firm takes place, as well as the realisation of the tender procedures and the selection of the general contractor responsible for the technical and construction facilities and the production introduction.

The tender documents should be worked out by the consultants and, approved by the customer, sent to the selected enterprises.

The foundation of a firm contains the conclusion of the foundation contract, draft of the initial balance and the necessary registration of the enterprise with the competent state institutions.

The necessary documents are as follows :

A. Tender documents

- drawings of the project
- description of the buildings
- description of the installations
- requirements to the production process
- description of quality input and outcome values
- references to standards (allowances)

B. Tender catalogue

- detailed list of offers
- plan of implementation
- plan of payment
- plan of purchasing
- securities (eventually warranties for the contractor and the customer)

The approved tender documents will be sent to the selected companies which were chosen due to their competence and/or reference. The tender must be launched in Europe at least, eventually world-wide.

During the course of this project, some internationally known production enterprises were asked for written budget offers to the tender in order to receive a calculation base. This does not substitute the detailed tender mode, from which further investment savings can be expected.

In the 2nd stage, the conditions of supplying (production, purchase, barter) with initial material necessary for sleeper production must also be specified in detail (arrangements with the future suppliers).

The evaluation of the received offers is done according to the pre-set evaluation scheme. After the selection of the potential contractor the contract negotiations are to be held between the key persons which represent the parties in the steering committee of the project.

After evaluation and realisation of the contract negotiations, the general offerer is to be selected who will be entrusted with an order to work out the planning, implementation and introduction of the complete project. Local enterprises should be considered for the construction works in case if their services (quality, price and guaranty) meet the corresponding requirements. The tender mode should be applied here as well.

The implementation of the project implies the controlling by the engineering office experts of the terms fixed in the planning stage as well as the final acceptance of subcontractors. The customer then accepts the fulfilled works from the contractor (general offerer).

The general offerer organises and carries out the corresponding training for handling the technical installations and equipment.

Furthermore, the general offerer's support must be considered during the introduction and start-up stages.

The general overview of this management strategy can be found in Annex 6.5-3.

2. BOT - Mode

The BOT - Mode (Build - Operate - Transfer) implies, in general, the transfer of the production creation and the operation by the contractor (BOT partner) for a fixed period (10-15 years) with the guaranty that the entire production installations, technology and business relations will be handed over to the customer, on the expiration of the stipulated period.

Similar to the tender and entrustment modes, the consultants are to be entrusted to draft the tender documents on the base of the given terms of reference as well. This should be done also in the framework of a project together with the participating railways .

The tender documents have the same volume as for the above mode and all questions related to financing, implementation, introduction of production and production itself belong to the responsibility of the BOT partner. BOT partner can be both national and foreign companies or offerers' consortiums.

Having been selected, the BOT partner is advised to take over on his own responsibility the creation of the production and the operation of the installations. The financing for the project in tender stage is advised to be secured by means of loans from the EU.

A BOT- contract between the BOT - partner and the customer(s) is to be concluded which should contain the following points :

- duration of the contract,
- services of the BOT - partner,
- participation of the customer in the production creation and operation stages,
- volume of the investment,
- customer's guaranties for the purchasing of the final products which are to be specified in individual supply agreements,
- purchasing prices for the whole period of the contract,
- quality standards,
- take over procedure on the expiration of the contract.

The award of the contract to a BOT-partner implies the complete financing by the BOT - partner.

The implementation of this mainly technically and technologically oriented project implies the realisation of a commercial project to the foundation and organisation of the enterprises before the expiry date of the BOT-contract. Particularly, the commercial and organisation basement for the operation and controlling of the enterprise is to be created within the framework of this project.

This concerns the following fields:

- enterprise management and controlling incl. accounting,
- departmental organisation,
- interfaces to partners,
- interfaces to state bodies.

It is necessary to prepare the conception for the following take over of the plant and the expected foundation of the respective firms and to duly come to an agreement with the BOT- partner.

The procedure is described in Annex 6.5-4.

3. Enterprises with participation of foreign technology partners

This strategy means that already in a very early stage, foreign technology partners, which have both the technological and financial potential for the foundation of the firms, are involved in the whole procedure of the foundation.

The tender on the base of the Terms of References is carried out similar to that of the other strategies. The potential technology partners are selected first of all under the following preconditions:

- adjustability of the partners to the national interests of the railway administrations or other national or international joint venture partners,
- the proven availability of the technological and financial potential,
- experiences in joint venture realisation in Eastern Europe,
- goals and capacities of the partners in the framework of the joint venture,
- competitive price for the equipment to be purchased and the training to be organised,
- support in providing of financing,
- readiness to carry out accompanying measures in the operation stage of the sleeper manufacturing.

Upon selecting one or more partners, eventually also partner consortiums (offerers consortiums), the enterprises are founded in accordance with the national legal regulations.

In case that particular services necessary for the plant creation cannot be provided by the participants on their own, the tender mode is to be applied, too.

The construction works being completed and technical equipment being installed, the organisation creation is supposed to be finished and the permanent operation can start.

A permanent project accompanying by the technology supplier (Know-how-partner) is envisaged in all project stages especially in the stage of production introduction. This can be seen in Annex 6.5-5.

6.5.1.1.4 Comparison of the management strategies

The a.m. strategies can be weighed only globally by means of their comparison with the respective goals of the potential participants or proceeding from the state of the national economy.

The described strategies have the following advantages (+) and disadvantages (-):

1. Enterprise without foreign technology partner

- + the lowest expenses per sleeper provided only domestic raw materials and machinery are used
- + highest value creation rate resulting from the participation of only national enterprises and labour
- + influence of the railway(s) on the sleeper manufacturing enterprise
- all investments must be provided by the national railways (internal funds and credits)
- due to the absence of foreign technology partners licenses have to be arranged at expensive prices
- the absence of foreign technology partners can lead to problems with the acceptance of sleeper exports to the neighbouring countries
- the costs per sleeper can fluctuate depending on the local supply conditions
- the pre-set quality standards can hardly be met
- the personnel training is questionable

2. BOT - Mode

- + no need for investments for the foundation of the sleeper production for the local partners/railways
- + the lowest business risk
- + the maximum quality
- + guaranteed fixed price per sleeper
- higher costs per sleeper (commercial risk premium for the operation and pre-financing of the sleeper production plant)
- no proprietary rights during the BOT - phase
- low value creation rate for the region
- low possibility to influence the sleeper manufacturing

3. Enterprises with foreign technology partner

- + secured know-how-/ technology - transfer for the sleeper production
- + secured influence of the railways on the sleeper production
- + management - know - how
- + investment risk sharing
- + advantageous international conditions for production co-operation

- the conflict of interests in price setting owing to diverse goals to gain profits
- fluctuating costs per sleeper, in particular, depending on the production volume
- dependence on the technology partner.

Technology partners expressed their interest in all three strategies. The consultant recommends the foundation of a joint venture with foreign technology partners. This strategy is fixed in the minutes of meeting in Tbilisi of 17.07.1997 and Baku on 22.07.1997. (see Annex 6.5-6)

However, the final decision in favour of this management strategy depends on the financing. For this reason, on making decisions on this issue, the other management strategies have to be taken into account as well.

6.5.1.1.5 Ownership strategies

Considering the law of obligations, only share holder companies were studied.

They are :

- limited liability companies,
- share holder companies, closed and open forms.

These forms of enterprises were studied according to the worked out methods concerning the following bases and their application to the sleeper production:

- legislative and juridical ,
- economic and tax-related
- financial (compare Annex 6.4-3).

The limited liability company seems to be a suitable company form for the foundation of a Joint Venture in the field of sleeper production. This is confirmed irrespective of the management strategy to be selected just due to the little number of potential founders. Further, there will be only a limited number of possible participants. The determined capital needs (see investment costs) are relatively small and a great issue of shares will not be necessary. In the near future new purchase of fresh capital is not necessary. Similar to the limited number of potential partners, there is a definite market with a small number of purchasers.

Further reasons for the limited liability company as an enterprise form in the field of sleeper production are:

- no marked differences in the taxation in comparison with the share holder company
- low foundation and running expenses incurred by legal support and consulting.

The contributions of the founders and the value of the authorised fund depend, in this case, on the management strategy.

In principle, the above enterprise forms are compatible with the various management strategies except the management strategy BOT - mode. Therefore the presented management strategies can be realised in every presented enterprise form with the exception of BOT. The recommended structure of founders, taking into account the national legislation, is shown in the tables 6.5.1 and 6.5.2 .

Tab. 6.5-1: Overview of participation for the sleeper plant - Azerbaijan

Ownership strategies	AGZD	GK PROM-STROI	GK AZ-CHIMIA	Techno-logy-Partner	BOT-Partner
Management strategies					
Enterprises without participation of technology partner	33,3%	33,3%	33,3%	--	--
BOT - Mode	--	--	--	--	100,0%
Enterprises with participation of technology partner	min. 17,0%	min. 17,0%	min. 17,0%	max. 49,0%	--

Tab. 6.5-2: Overview of participation for the sleeper plant - Georgia / Armenia

Ownership strategy	GRZD / ARM	Techno-logy-Partner	BOT-Partner
Management strategy			
Enterprise without participation of technology partner	100,0%	--	--
BOT - Mode	--	--	100,0%
Enterprise with participation of technology partner	min. 51,0%	max. 49,0%	--

It must be considered that, despite the interest of both Armenia and Georgia to have the sleeper production plant each in their own country, a decision for the supply in the area West should be found with mutual understanding.

Furthermore, a scheduled construction and reciprocal demand covering by production in the two locations (Azerbaijan, Georgia) should be aimed at.

The value of the shareholder equity should be 100.000 US-Dollar and paid according to the shareholders' participation.

It must be taken into account, that each founder brings his contribution in various forms. The contributions are brought in form of production sites (workshops), equipment or in monetary form. The production sites given to the enterprises to be founded should be evaluated by independent experts.

All values given for use to the enterprise and exceeding the necessary contribution size specified in the foundation contract are certified as liability before founders in the balance sheet on the passive side and made an interest charge on terms established by the founders and reimbursed (drawing up of interest and repayment plans).

The incurred costs (interest rate on equity for the founders) are to be taken into account in the business plan.

6.5.1.2 Organisation structure

The future Joint Venture's structure should be organised according to the support staff / line management system. The following structure should be created:

1 st Level	:	management department	- Management, book-keeping, controlling, personnel
2 nd Level	:	Special departments	- Supply, production, sales
3 rd Level	:	Special departments	- Storage, test laboratory

The organisation structure can be seen in the Annex 6.5-7.

6.5.1.2.1 Task description

The description of functions has to be made for all three levels. The descriptions of functions should not be connected with concrete persons. They consist of the tasks, competence, volume of work and working hours etc.

1st Level

One of the tasks of the general manager, as well as of the commercial director and technical director, is the business guidance of the sleeper plant. The general manager is nominated by the founders. His functions are stipulated in the general manager contract and need approval by the meeting of founders.

The departments *business accounting* and *controlling* are cross-section departments and are directly subordinate to the plant management and embrace entire central book-keeping. The *personnel* is also subordinate to the central department.

Equally to book-keeping, the most important tasks are cost management, accumulation and valuation of cost types, cost centres and cost unit calculation as well as planning and controlling of budget plans for individual special departments and the entire enterprise.

2nd Level

The department *supply* includes the processing of all procedures related to the purchase of all necessary initial materials (operating and auxiliary material) proceeding from the approved budget. The department *production* is described in section 6.5.1.3. The tasks of the department *sales* are the complete product sales processing and marketing.

All special departments operate on their own, but in cases which exceed their competence, like, for instance, barter relations with initial material and finished products, they are supposed to co-operate. All special departments are subordinate directly to the management. A department manager is at the same time a deputy general manager.

3rd Level

The special department *test laboratory* is to be considered as a particular department and is subordinate to the special department production. Its tasks are chemical and physical analysis of initial material for the production, semi-finished products and sleepers in terms of a standard conformity, composition, quality and allowances.

The special department *storage* is subordinate to the sales department and is engaged technologically in the storage of ready sleepers (no production storage) and in the sleeper dispatch preparing.

6.5.1.2.2 Interfaces to railways

As the foundation of the sleeper production enterprise does not include activities in a department, which was before mainly within the competence of the railways, there are only few interfaces between the railways and the future sleeper plants.

The relations between the railways and the concrete plant are regulated in the first place by means of supply contracts and supply conditions and purchasing agreements. Long-term supply and purchasing contracts between sleeper plant and the railways are recommended in order to achieve the wanted planning security and permanent use of production capacities. These long-term contracts and agreements should be supplemented with contract specifications for a term of less than a year.

The railways will transport the produced sleepers to the destination places after a selected quality control at the plant on their own account and responsibility. This means that logistics ex works for the dispatch of the finished sleepers is realised by the railways.

The delivery of the initial material to the plant belongs to the responsibility of the sleeper plant which eventually concludes respective contracts with the railways.

6.5.1.3 Operating

6.5.1.3.1 General

Based on the positive experience with prestressed concrete sleepers made for West European railways, a prestressed concrete sleeper was developed for the necessary gauge of 1,520 mm with the tried and tested W- fastening. The automation of manufacturing procedures has been kept at low level on purpose. Electrical switching or microprocessors, only accessible to authorised qualified staff, have been envisaged for the most important stages of manufacture, such as the mixing of concrete, the compacting of concrete when producing the sleepers and the prestressing of the sleepers. The manufacturing plant is to be installed into an existing workshop (Dollyar/Azerbaijan). Existing budget offers are based on the assumption that:

- Portland cement is available in a sufficient amount and quality,
- aggregate, coarser grain size than broken grain,
- prestressing steel in the required rod thickness,
- auxiliary staff and hoisting equipment for the assembly and
- the required construction services with the necessary infrastructure on location are available or can be made available,
- the necessary permissions by the authorities on location have been obtained.

6.5.1.3.2 Technical description of the prestressed concrete sleeper production, DSA system

The sleeper plants are to be dimensioned for an output of 400 sleepers per shift. The processing plant for the ready-mixed concrete is located at the beginning of production:

- scraper with star arrangement,
- electrical and mechanical aggregate feed scales,
- feed lift,
- 1,500 litre pug mill mixer with one or two shutters at the bottom,
- minimum two cement silos with outgoing screw conveyors,
- electrical and mechanical cement scales,
- electrical and mechanical water level, scales for additives,
- microprocessor - dosage control and
- supporting steel structure.

The necessary machines and equipment for a sleeper plant are listed in Annex 6.5-1.

6.5.1.3.3 Production process

The concrete is discharged through the opening in the bottom of the mixer into a discharge hopper, with an electrical and pneumatic shutter. The conveyor belt under the hopper feeds one or several mobile concrete distributors with concrete. The concrete distributor moves to the table vibrator. This table consists of a sub-construction with swinging metal on which two guided vibrator frames are set. The vibrator frames are fitted with external vibrators. A noise insulation is necessary because of the loud noise generated. The pre-manufactured moulds (triple or quadruple moulds) can stand on the vibrator frame without clamps and are fitted with casting moulds, pots, concrete female bells, gripping yokes and dowels. Subsequently the moulds are sprayed with a separator.

Then the feeding of concrete can start. The mobile concrete distributor moves over the mould and fills every trough, one after the other, via the cell wheel mounted at the container discharge. During the filling process, the external vibrators are switched on and switch themselves off after a minimum vibration time. An exact filling height and a smooth surface of the sleepers are achieved with an applied-load beam fixed to the mobile distributor. The bottom plates to cover up the troughs are stored beside the table vibrators. They are placed onto the troughs manually and clamped to the mould. The mould is then picked up with a rotating beam of the gantry crane and turned by 180 degrees in order to be set down at the stripping position. After removing the clamps, loosening the gripping yokes, pulling out the pots and casting moulds, a partial stripping is conducted electrically and mechanically, followed by a complete stripping with the gantry crane. While the mould is moved back to the vibrating table for preparation, the finishing work is carried out on the fresh sleepers lying on the bottom plates. A second gantry crane with a combined beam, takes up the bottom plates with the sleepers and transports these into the fresh-sleeper store for maturing. The fresh-sleeper store has to be suitable for the storing of 2 x 540 sleepers. The fresh-sleeper store has to be extended by 2 x 6 x 3 x 5 = 180 sleepers each. The maturing time is approx. 24 hours without extra heat being added. The maturing period depends on the grade of the cement used in Azerbaijan and Georgia, which has to be established.

The matured sleepers are either fed directly to the chain line with the help of a lifting beam and gantry crane or to the finishing line with the sleeper car. The sleeper fastenings are fitted and screwed down at the finishing line. Furthermore, the following work is conducted:

- manual fitting of the stressing fixtures,
- unscrewing the slotted nuts with a pneumatic screwdriver,
- exerting the prestressing force with a manual stressing gadget,
- injecting cement paste into the stressing channels,
- filling up the front side openings of stress holes and cross sides with mortar.

The sleepers are lined up with an accumulating conveyor, and outside the shop, they can either be stored away or shipped immediately with a gantry crane fitted with different beams, which can carry 10, 20 or 30 sleepers. The required total electrical load is 400 kW and an operating voltage of 400 V / 50 Hz. Some 1 m³ of industrial water are required every hour for producing the cement paste to be injected.

6.5.1.3.4 Staff requirements

There are the following staff requirements for a one-shift operation:

vibrating tables 1 and 2	4 people
vibrating tables 3 and 4	4 people
crane	4 people
processing	1 people
finishing line	6 people
shipment	2 people
fittings	2 people
<u>test lab</u>	<u>2 people</u>
Total	25 people

6.5.1.4 Financial evaluation

Calculations are based on figures given in the technical part. Adjustments have been made for electricity costs (the present electricity prices being below the cost prices) and for depreciation and maintenance.

The two sleeper plants resemble each other regarding the costs, except for the investment costs for the buildings, which are lower in Azerbaijan due to existing buildings, and for the costs of raw materials, additives and electric energy.

It has been supposed that the sleeper requirements of all three railway systems are met by the two plants in such a way that the Azerbaijan plant works for the Azerbaijan network and the Georgian plant for the Georgian plus the Armenian ones.

Initial replacement programme 1999-2002 (unrestricted):

for the Armenian network	83,000	sleepers/year
for the Georgian network	200,000	"
for the Azerbaijan network	250,000	"

Routine replacement: about 86% of above figures

Calculations are first carried out for the case of an unrestricted sleeper replacement programme, in Annex 6.5-22. After having completed the renewal of the sleepers on the main lines, the routine replacement would still occupy the capacity of the Georgian and the Azerbaijan plants, if an operation in two shifts is assumed. It is stated that, if the railways buy the calculated number of sleepers at the unit price of 40 US\$ net of VAT ex factory (also assuming the railways pay 100% of the invoiced amounts), the sleeper plants are financially viable. The internal rate of return (IRR) is then 10.7% for the Georgian plant and 13.9% for the Azerbaijan one. There is no basic difference in the global results whether, in the first years, only the sleepers of the lines carrying international traffic are replaced, instead of those of all main lines (the latter case being calculated here).

A restricted sleeper production is also examined in Annex 6.5-23, with the following demand figures:

Initial replacement programme 1999-2002 (restricted):

for the Armenian network	75,000	sleepers/year
for the Georgian network	130,000	"
for the Azerbaijan network	180,000	"

Routine replacement: about 86% of above figures

At the same conditions as in the unrestricted demand, the IRR is 5.7% for the Georgian plant and 8.7% for the Azerbaijan one. If a sleeper unit price of 42 US\$ instead of 40 US\$ is assumed, which is still very reasonable, the IRR is 12.6% and 14.9% respectively.

The production costs consist of about 90% of materials, of which about 70% have to be imported (supposing that at least the cement and the additives are provided locally). This cost pattern has the advantage that the risk of losses through underutilisation of capacity is limited.

On the basis of details given in the technical description of the plant (Annex 6.5-1), the fund requirements for investments (rehabilitation measures) and starting capital can be summarised as follows:

Table 6.5-3: Cost of implementation of the two concrete sleeper plants (unrestricted demand)

Sleeper factory in Component	Georgia			Azerbaijan		
	Total cost US\$'000	of which		Total cost US\$'000	of which	
		foreign currency US\$'000	local currency US\$'000		foreign currency US\$'000	local currency US\$'000
Buildings incl. installations	1,000		1,000	500		500
Machinery	6,000	6,000		6,000	6,000	
Working capital ¹⁾	2,585	1,550	1,035	2,225	1,330	895
Interest during construction ²⁾	479	479		436	436	
Total	10,064	8,029	2,035	9,161	7,766	1,395

1) for ¼ of the expenses of the first production year (1999), excluding interests

2) 3% p.a. for the part not yet used and 7% p.a. for the part used, the construction period being supposed to take place over the whole year 1998

In the calculations, it has been assumed that an investment loan from an international lending institution covers the fund requirements for the equipment and the buildings plus the working capital.

6.5.1.5 Financing sources

Financial requirements for the concrete sleeper production are based moneywise on the investment amount of the production sites and quantitywise on the replacement needs of the three railway organisations. On-site inspections have led to the conclusion that the sites at Dollyar (Azerbaijan) and Tbilisi (Georgia) are suitable for the two recommended production factories. The annual replacement requirements for concrete sleepers averages around 500.000 pieces for all three countries produced at equal parts at the two locations.

According to the business plan, which contains the components

- civil works and installations
- machinery and equipment
- working capital
- interest payments,

the total investment cost for Georgia amounts to US\$ 10.1 million and Azerbaijan US\$ 9.2 million respectively.

Under the assumption that there is no other financial source, the loan requirement amounts to US\$ 9.439 million for Georgia and US\$ 8.872 million for Azerbaijan respectively, according to the cash flow analysis assuming full scale production of annually 230,000 sleepers on an average at each factory with a sales price of US\$ 40 per sleeper. If the demand for sleepers drops by 50 %, the loan requirements come to US\$ 8.251 million for Georgia and US\$ 7.708 million for Azerbaijan, respectively, with an annual production of 115,000 sleepers on an average at each factory with a sales price of US\$ 45 per sleeper.

The general conditions assumed for the loan are in accordance with the EBRD terms and are stated as follows:

- interest rate 7 % p.a.
- duration time 20 years
- grace period 5 years
- constant repayment

A detailed financial analysis is not yet possible, since the joint venture is still in the planning stage. The financial structure heavily depends on the organisational structure including the ownership participation.

The shareholder pattern offers a wide range of financial participation by each possible partner according to their financial capabilities. One has to keep in mind that in general shareholder equity forms the basis for debt financing. If PROMSTROI is thinking of asset contribution, the value of the civil works at Dollyar has to be evaluated by experts. If AZ CHIMIA plans on cash financing, the investment has to be finalised. On the other hand, the western technology partners expressed their interest to gain at least a 51 % shareholder position. In order to clarify the relationship between shareholder participation and financial contribution by each possible partner, intensive bargaining will be necessary in the near future.

The financial implications for the three stated management strategies in accordance with the cash flow analysis are as follows:

Case 1: Joint venture without foreign partner

- a) for Georgia: Out of the total investment of US\$ 10.1 million, the local portion of US\$ 2.0 should be covered by local partners as a minimum requirement. The remaining portion of US\$ 8.0 million should be covered by loan, preferably by EBRD loan (US\$ 20 million at present under discussion).
- b) for Azerbaijan: Out of the total investment of US\$ 9.2 million, the local portion of US\$ 1.4 million (15 %) should be covered by local partners as a minimum requirement. The remaining portion of US\$ 7.8 million should be covered by loan, preferably by EBRD loan (US\$ 20 million at present under discussion).

Case 2: BOT concept

With a Build/Operate/Transfer concept, the financing issue becomes the supplier's responsibility. For a German consortium (one of the industry offers received) export supplier financing can be backed by KfW export loans with HERMES state guarantees.

Case 3: Joint venture with foreign partner

The minimum requirement for the local partners is also valid here (see Case 1). In addition, the foreign partner financing depends on the ownership participation, also the foreign (German) partner has access to KfW export loans plus HERMES guarantees.

6.5.1.5 Human resources

The basic qualification of the personnel on the spot is readily available at present for the sleepers production itself, if one proceeds from the assumption that the plant will be maintained by external experts. This is recommended, since otherwise the qualification requirements as to local personnel will considerably increase which, in the Consultants' opinion, is disproportionate to the advantage of having the facilities maintained by external staff.

Special requirements, however, result from a new test technology which is the basis of the product's future quality. Here, a special training of the personnel will be indispensable, to be followed by a "training on the job", supported by expatriate staff.

Further, additional qualifications will be necessary in the logistics department. Though the production planning and storage technology to be needed for keeping the promise to supply quality are being supported by organizational rules, they can only be guaranteed in the long run if they are based on the staff's knowledge of the system.

Last but not least this depends on a well-functioning co-operation with the railways, which means that particularly the marketing department will have to meet special requirements.

However, the enterprise's objectives regarding the sleepers production do not require extensive employment of external personnel.

Further, more general information regarding the personnel's qualification can be taken from chapter 6.7.

As to the number of personnel needed see section 6.5.1.3.

6.5.2 Electro-locomotive plant

As all investigations showed, the bad condition and the out-of-date technology of the electric locomotive fleet are the key problems of the Caucasian Railways concerning rolling stock. Therefore, a well balanced combination of partly maintaining the old locomotive fleet, partly renewing by re-motorisation and partly procuring new locomotives after 2010 was proposed as to be found under the chapter dealing with the rolling stock business strategies. However, in order to ensure the maintenance capabilities for KR-1 and KR-2 overhauls as well as for re-equipping (re-motorisation) there is an urgent need to refurbish the respective shops and the concerned halls of the Tbilisi Electro-Locomotive Construction Factory (TECF).

At the moment, there is no capacity for developing and manufacturing electric locomotives independently and only limited capacities for conducting major repairs of the KR1 and KR2 categories. The KR1 and KR2 major repairs have to be carried out in Russia or Ukraine.

Taking into consideration the high financial load of both the needed investments inside TECF caused by the backlogs in maintenance the civil constructions, installations and equipment of TECF and overcoming the high distance to modern technical and technological solutions for locomotive design and construction, the best way for solving all these difficulties seems to be creating a Joint Venture of the interested Caucasian Railways and international locomotive producer(s).

6.5.2.1 Management and ownership strategies

6.5.2.1.1 General

Investigating this point of the task a differentiation has to be made between the development / manufacture and the maintenance / repair of electric locomotives.

According to statements by locomotive manufacturers, profitability of a plant for developing and manufacturing electric locomotives is only viable above 50 locomotives per year, at least. The output of the Tbilisi electric locomotive plant, for instance, came up to 170 locomotives per year, at the end of the 80s.

The secured demand in the three countries will, however, be much smaller in the foreseeable future. In the optimistic scenario, about 12 locomotives can be expected per year only as of the years 2006 - 2010, so that, presently, the construction of such a plant for the manufacture of electric locomotives would neither be profitable for the countries themselves nor for foreign firms.

In view of the current condition of the locomotives, the amount of repair and maintenance cost as well as the future development of the transport volume, it is urgently necessary to create modern maintenance capacities, which make it possible also to

modernise the drive units, above all. Western technology know-how is indispensable for this task.

6.5.2.1.2 Business goals

The selection of a suitable ownership strategy is based on the investigation of the objectives and tasks of a future company in the area of maintenance for electric locomotives:

1. Short and medium-term business goals

Related to quality

- meeting the repair and maintenance demand for the existing electric locomotives in the three countries;
- guaranteeing the transport and operational safety of the locomotives;
- creating operational reserves and thus a capacity pool, which enables a flexible reaction to an increasing transport volume;
- independence from foreign repair capacities (Russia and Ukraine);
- replacing components or individual units by modern Western standards and thus increasing the independence from spare part deliveries from Russia and Ukraine;

Related to quantity

There is the following repair and maintenance demand for major repairs (KR1 and KR2) on electric locomotives during the period of 1998 - 2000, total for the entire region (optimistic scenario):

–	KR1	:	143
–	KR2	:	33

The individual countries have the following shares:

	KR1	KR2
ARM :	20	11
AGZD :	76	11
GRZD :	47	11

These goals and numbers have been determined by the potential participants and depending on the interests specified as "Must-goals" or "Can-goals" (comp. Annex 6.5-8).

2. Long-term business goals

- employing modern technologies (three-phase technology) and testing instruments;
- increasing the reliability of rail transport;
- reducing maintenance costs;
- decreasing the specific energy consumption per tkm or pkm respectively;
- cutting down the wear of the locomotives and the superstructure;
- alleviating the dynamic forces and the high axle loads, which lead to a faster wearing out of the superstructure;
- increasing the efficiency of the locomotives;
- equipping new electric locomotives with modern drive technology.

6.5.2.1.3 Management strategies

There are two possible management strategies for setting up a locomotive repair plant:

1. Companies *without* participation of foreign technology partners.
2. Companies *with* participation of foreign technology partners.

The operation of such companies without involving a competent technology partner is not advisable due to the current technological backlog.

Such a company should be set up in two phases at least.

In the **first phase**, one should not attempt a company formation with potential technology partners, but rather a contractually secured cooperation through syndicate agreements.

The following issues should be included within the framework of the syndicate agreements:

- tasks and limitations,
- fitting out agreements,
- purchasing guarantees,
- responsibilities,
- training,
- technical support.

The following *short-term* tasks could be taken over by the technology partners during the first phase:

- consulting, planning and project management in refurbishing buildings and adapting the infrastructure,
- creating capacities for the maintenance of drive motors,
- fitting a variety of new supporting installations for conducting repairs effectively,
- providing new electric equipment and measuring gear,
- training and supporting the local experts.

At the same time, the modernisation of the existing locomotives by switching over to modern components and equipment is the priority task, in order to ensure reliable operation of the locomotives. An additional effect of this measure is the introduction of local experts to the handling of modern traction material.

Only in the **second phase**, a company may be set up involving the previous potential technology partners.

The reason for this gradual approach is the current technical condition of the installations, the structural condition of the buildings and the lacking of up-to-date know-how of the experts.

Since a period of at least four to six years is expected for the first phase, a detailed description of the second phase has not been included in this study.

Only in the second phase, long-term tasks such as refurbishment or construction should be started. However, preparatory investigations should be carried out already earlier.

There are only a few technology partners world-wide, which could be considered for participation in such a company, e.g. firms such as ADtranz, GEC Alsthom and Siemens, so that the necessary tender should only be of a limited nature. A cooperation with the above mentioned companies is recommendable for the following reasons:

1. World-wide acting multinational concerns, which have the pertaining know-how in the area of manufacturing electric locomotives.
2. The companies already have experience in the East European / CIS market.
3. There exists an interest in a commitment in the Caucasus region.

The tender procedures should start with the railway administrations involved commissioning an engineering office (Consultants) with the tender for the modernisation of the locomotive repair plant, on the basis of their demands (Terms of Reference).

The tender documents should comprise a technical specification such as:

- requirements of the client on technical and structural installations
- capacity (possible capacity variations)
- technology
- safety
- standards
- operation
- demands on quality
- requirements on the format and scope of the order processing .

The tender documents are drawn up by the appointed consultants and after coordination with the Client, they are sent to the selected companies, which are short-listed due to their competence and references including the following documents:

A. Tender documents

- project drawings
- description of the buildings required
- description of the technical plant

B. Tender catalogue

- detailed list of offers
- implementation schedule
- payment schedule
- acceptance schedule
- security (possibly bank guarantees) for the Contractor and the Client.

The assessment of the offers submitted is conducted with the help of an evaluation scheme agreed in advance.

The selection of potential technology partners should be conducted primarily according to the following priorities:

- adaptability of the partner to the national interests of the railway administrations or further national or international joint-venture partners,
- verifiable availability of technological and financial potentials,
- experience in joint ventures in Eastern Europe,
- objectives and capacities of joint-venture partners within the own organisation,
- competitive prices for the purchase of required equipment and for conducting training courses,
- support in providing the necessary financing.

6.5.2.1.4 Ownership strategies

A company of limited liability seems to be the suitable form for setting up a joint venture in the area of locomotive repair (comp. section 6.5.1.1.5). The following participation is suggested due to the location established (in %):

Tab. 6.5-4: Overview of the participation for the TECF Electric Locomotive Repair Plant

Ownership participation	GRZD	AGZD	Technology partner
Management strategy			
1st Phase company without participation of technology partner	51.0	49.0	--
2nd Phase company with participation of technology partner	24.5	24.5	51.0

During the first phase, the participation between the companies and the technology partner is based on so-called syndicate agreements (comp. Management Strategy).

At first, Armenia will not be included as a partner in the joint company due to the political situation and the lowest repair requirements. The relationship with Armenia should be established with the help of service agreements during the first phase. The later integration of Armenia into the company should be conducted in the long run, given the political prerequisites. Within the framework of this later integration, the repair or supply of partial components could be transferred to Armenia

6.5.2.2 Organisational structure

The future joint venture should be structured according to the staff-line organisation. The following structure is to be set up:

- 1st level : management areas - management, accounting, controlling, personnel
- 2nd level : specialist areas - procurement, production, sales
- 3rd level : special areas - development, Total quality management (TQM)

There is a depiction of the organisational structure in Annex 6.5-9.

6.5.2.2.1 Tasks

Job descriptions have to be drawn up for all three levels. These job descriptions, which are not linked to any special individual, define the tasks and authority, the scope of work and the working time (e.g. shifts), deputy rights and deputy regulations etc. The most important tasks are briefly described in the following:

1st Level

The tasks of management comprise the entrepreneurial leadership of the locomotive repair plant. This includes the tasks of a technical and a commercial manager. The managing director is appointed by the partners. His scope of responsibility is laid down in the managing director's contract and require confirmation by the shareholders' meeting.

Accounting and controlling are cross-sectional departments and thus report directly to management. The entire central accounting system is integrated into these departments. Personnel is also allocated to the central area.

Apart from accounting, the main tasks consist in cost management, pooling and evaluating the cost-centre, cost-type and cost-unit accounting, the planning and control of budget plans for the respective special departments and the entire company.

2nd level

The *procurement department* is responsible for the entire purchasing of all required materials and spare parts, operating and auxiliary materials. This is done within the allocated budget. The *production department* is described in section 6.5.2.3. The *sales department* is responsible for the complete handling of selling the products and for the marketing.

All special departments operate on their own responsibility, whereby they cooperate on general issues. All special departments report to management directly. The head of a special department is at the same time a deputy managing director.

3rd level

The development department is to be regarded as a special department close to production, but it still reports directly to management. The following tasks have to be covered:

- optimising maintenance technologies;
- working on the further integration of modern partial components into existing locomotives;
- developing and adapting new components;
- preparing new manufacturing technologies;

- preparatory work on the complex reconstruction of the existing electric locomotives, especially by using the three-phase technology, modern high-performance electronics and new bogies.

The development department is to create the decisive prerequisites for the further economic use of the existing locomotive fleet and the step by step transfer to using modern maintenance technologies

TQM department fulfils quality management tasks and reports directly to management.

6.5.2.2 Interfaces with the railways

Railways are to participate as owners in the locomotive plant to be set up. The locomotive plant is legally totally independent. The relationship with the railways is purely delivery based (client - contractor). This should be laid down in long-term contracts. These contracts should cover the following issues:

- conditions of delivery
- repair times
- purchasing obligation
- demands on specifications
- terms of payment.

Joint specifications had not been drawn up by the end of the project work.

6.5.2.3 Operating

6.5.2.3.1 Actual condition of TECF

A first overview of the concerned TECF shops is to be found under Annex 1.6-16. The needed shops as main assembly shop, electro machine shop, bogie repair shop, electric equipment shop, electric motors and coil shop, mechanic parts shop, painting shop and testing shop are located inside the halls 1, 2, 3, 4B, 5 and 11. The found bad condition of all of these TECF halls needed for main/general overhauls and re-motorisation does not allow to start at once the production procedures because of leaky roofs and overlights, damaged windows, blocked outlets in floors and canals, damaged tracks, and damaged lighting and heating systems. The installations and the constructional equipment inside the respective shops are also in bad condition, as regularly maintenance of machine tools was not done and principal inspections of cranes were not fulfilled. As up to now a wheel-set repair shop does not exist, such a shop should be established in hall 3.

In some cases needed equipment is to be added that means to procure as for the wheel-set repair shop, mechanic parts production shop and testing shop.

6.5.2.3.2 Needed measures for upgrading TECF

The needed measures for upgrading TECF can be shortly described with measures for civil constructions, installations and equipment for the halls and shops mentioned above. Going into details of civil constructions the halls 1, 2, 3, 4B, 5 and 11 should get capital repairs of the roofs, overlights, rain tubes, etc. , cleaning and colouring the doors, floors and windows. Concerning installations all tracks need occasionally repair. The canals, canal lighting and sewerage should be cleaned and repaired. The halls lighting and heating systems need capital repairs. Concerning the equipment of the shops in all cases, besides of the special machine tools listed in the Annexes, cranes and crane tracks should be inspected and repaired. The needed measures for the different shops are summarised in various Annexes as given in the following table.

Table 6.5-5: Overview of different shops and respective costs

No	hall	shop	costs in US\$	to be found under
1	1	Electro machine shop	873,000	Annex 6.5-11
2	1	Locomotive main assembly shop		Annex 6.5-11
3	3	Bogie repair shop	3,596,000	Annex 6.5-12
4	3	Wheel-set repair shop		Annex 6.5-12
5	2	Electric equipment shop	453,300	Annex 6.5-13
6	2	Electric motor stators and coils shop		Annex 6.5-13
7	5	Mechanic parts production shop	362,000	Annex 6.5-14
8	4B	Painting shop	119,700	Annex 6.5-15
9	11	Testing shop	178,080	Annex 6.5-16

As a part of the costs for the new wheel-set repair shop, the needed equipment was estimated with costs of 2,650,000 US\$ as to be found under Annex 6.5-17.

A special task for upgrading the TECF in a framework of a Joint Venture is the needed know-how transfer concerning traction motors of a new generation for the re-motorisation programme and later on a completely new electric locomotive.

The old DC - traction motors should be replaced by modern three-phase induction motors. Realising this measure the springless load per wheel-set to rails could be reduced from actually 5 to 2.5 tons.

The proposal is that a West-European locomotive producer could take part in the Joint Venture namely for delivering this main component for the re-motorisation project. In this case it should be underlined that the controlling system should be delivered by the same producer, too. Going this way the technical bottleneck seems to be the re-design of the respective bogies. This special technical question is further open and could not be a subject of investigations during this project.

However, this problem should be cleared up during the direct negotiations for the legal framework of the Joint Venture.

In order to prepare the construction of a new electric locomotive in long terms an overview concerning technical terms of a new locomotive generation was prepared based on the respective ideas of the three Caucasian Railways. The given results are to be found under Annex 6.5.2-9.

6.5.2.3.3 Future volume of TECF performances

Following the results extracted under the chapter before, in the future, TECF should carry out KR-1 and KR-2 overhauls as well as re-motorisation of electric locomotives up to the period to 2015 and only start with the production of new locomotives after 2005. The needed volume of the different maintenance steps is shown in the table below.

Table 6.5-6: Development of TECF performances

horizons	1998 / 2000	2001 / 2005	2006 / 2010	2011 / 2015
optimistic case				
KR-1	143	97	55	108
KR-2	33	54	55	108
re-equipping		103	69	18
new		0	58	202
pessimistic case				
KR-1	34	70	56	71
KR-2	76	56	56	71
re-equipping		93	69	22
new				69

6.5.2.3.2 Operating of the dismantling / assembling hall

The dismantling / assembling hall is to allocate inside the hall - „corpus 1“ -. This hall is described in Annex 6.4.2.6-2. The hall-part „locomotive main assembly shop“ is a square of 150 m length and 42 m width. There are 3 tracks inside this shop. The shop is already equipped with 4 gantry cranes. On each track 4 repair places are possible. In general 2 tracks should be used for the overhauls and the re-equipping (re-motorisation) and 1 track for construction of new locomotives. The more detailed need of repair places for KR-1 and KR-2 as well as for re-equipping is to be estimated. In order to create a basis for the estimation an average need of working days consumed by KR-1 and KR-2 was determined with 30 and 35 working days. For re-equipping 40 days should be sufficient. Using these figures the need of repair places was calculated. The achieved results are presented in the table below.

The overview shows a maximum need of 11...13 repair places in the assembling hall which can be covered by the 3 existing tracks inside the hall.

Table 6.5-7: Calculation of needed repair-places for locomotives

kind of repair	dismantling/ assembling days	dismantling/ assembling hours	max. locos - 2000	needed repair- places -2000	max. locos - 2005	needed repair- places -2005	max. locos - 2010	needed repair- places -2010	max. locos - 2015	needed repair- places -2015
optimistic case										
KR-1	25	200	143	5	97	10	55	1	108	1
KR-2	30	240	33	4	54	1	55	1	108	3
Re-equip- ping	35	280	0	0	103	3	69	2	18	1
Total places:				6		6		5		4
pessimistic case										
KR-1	25	200	34	1	70	1	56	1	71	1
KR-2	30	240	76	3	56	1	56	1	71	2
Re-equip- ping	35	280	0	0	93	3	69	2	22	1
Total places:				4		6		5		3

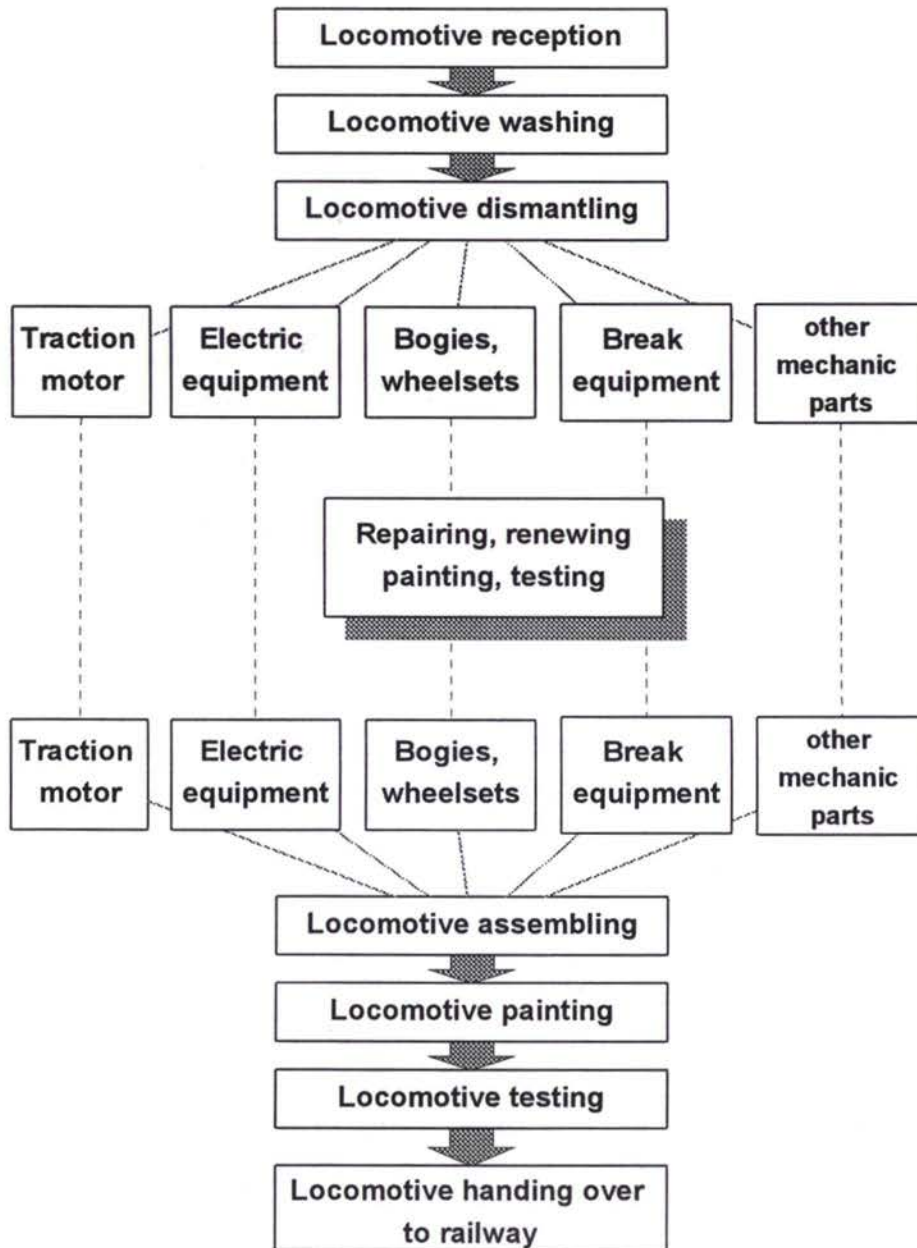
6.5.2.3.3 Operating overview

The operation of the TECF as a locomotive repair plant is to be focused on the main tasks as washing the locomotives, dismantling the main components, repairing the components, testing the components, assembling the locomotives, painting and testing the locomotives as whole units.

The operation procedure has to be organised like a critical-path graph between the main electric and mechanic components, such as traction motors, electric equipment for controlling, brake equipment, bogies and wheel sets and other mechanic elements.

As shops are needed a main assembly shop, an electro-machine shop, a bogie repair shop with a wheel set shop, an electric equipment shop, a shop for electric motors and coils, a mechanic parts shop, a painting shop and a testing shop.

Fig. 6.5-1: Operation scheme of TECF



6.5.2.4 Financial evaluation

Calculations are based on cost figures given for the rolling stock (Annexes 4.2.6-7a to 4.2.6-9b and 6.1.3-1). In these calculations, which apply to the full investment programme, the following rehabilitation and new procurements of locomotives were supposed:

Table 6.5-8: Rehabilitation and purchase of electric locomotives

Railway of / Period	Optimistic scenario				Pessimistic scenario			
	Re-equip. or new procurem.	Units	Cost per unit, US\$ '000	Total cost, US\$ '000	Re-equip. or new procurem.	Units	Cost per unit, US\$ '000	Total cost, US\$ '000
Azerbaijan								
2001 - 2005	Re	16	300	4,800	Re	16	300	4,800
2006 - 2010	Re	27	300	8,100	Re	27	300	8,100
2011 - 2015	New	114	4,000	456,000	New	57	4,000	228,000
Georgia								
2001 - 2005	Re	65	300	19,500	Re	55	300	16,500
2006 - 2010	Re	20	300	6,000	Re	20	300	6,000
2006 - 2010	New	43	4,000	172,000				
2011 - 2015	Re	18	300	5,400	Re	22	300	6,600
2011 - 2015	New	59	4,000	236,000				
Armenia								
2001 - 2005	Re	22	300	6,600	Re	22	300	6,600
2006 - 2010	Re	22	300	6,600	Re	22	300	6,600
2006 - 2010	New	15	4,000	60,000				
2011 - 2015	New	29	4,000	116,000	New	12	4,000	48,000

All these locomotives, except the newly purchased, will be reconstructed in the Tbilisi locomotive plant. The material value of above costs will be about 60% and the value added by the plant 40%.

The maintenance of the electric locomotives will also be done in the Tbilisi locomotive plant, according to the schedules given in Annexes 4.2.6-7a to 4.2.6-9b and 6.1.3-1. Maintenance actions of 100,000 US\$ per locomotive and more take place fully in this plant; for the others, only 25% take place there. As for the reconstruction, 60% of the maintenance costs consist of materials and 40% of value added at the repair shop.

Calculations for the optimistic scenario are carried out in Annex 6.4.2-1. It is stated that the locomotive plant is financially viable, with an internal rate of return of 10.2%.

The pessimistic scenario is calculated in Annex 6.4.2-2. The results are clearly negative at the assumed conditions. They would only become fairly positive if some costs could be saved. If labour costs were reduced by 20%, the internal rate of return would be 5.1%.

On the basis of details given in the technical description of the plant, the fund requirements for investments (rehabilitation measures) and starting capital can be summarised as follows:

Table 6.5-9: Cost of rehabilitating and re-starting the Tbilisi locomotive factory

Component	Total cost US\$ '000	of which foreign currency, US\$ '000	local currency, US\$ '000
Buildings (rehabilitation)	1,347.06		1,347.06
Installations (rehabilitation)	244.92		244.92
Machinery (rehabilitation and replacements)	3,990.60	3,990.60	
Working capital optimistic scenario ¹⁾	595.00	357.00	238.00
Working capital pessimistic scenario ¹⁾	339.00	203.00	136.00
Interest during construction optimistic scenario ²⁾	309.00	309.00	
Interest during construction pessimistic scenario ²⁾	296.00	296.00	
Total optimistic scenario	6,486.58	4,656.60	1,829.98
Total pessimistic scenario	6,217.58	4,489.60	1,727.98

- 1) for ¼ of the material costs of the first year (1998)
- 2) 3% p.a. for the part not yet used and 7% p.a. for the part used, the construction period being supposed to take place over the whole year 1998 (simplified assumption)

Loans from an international lending institution will be necessary in 1998 to cover the rehabilitation costs and the working capital, i.e.:

	<u>US\$ '000 (rounded)</u>
in the case of the optimistic scenario	6,178
in the case of the pessimistic scenario	5,922
in a medium case	6,050

The final beneficiary of the loans will be the Tbilisi locomotive shop, acting as an own entity.

The supposed loan conditions are:

- Duration 20 years, of which grace period 5 years; constant repayments, interest 7% of the amount of the loan less repayments;
- Interest during construction time (supposed to be the whole year 1998): 3.0% p.a. interest during construction time (1 year) of part of the loan not yet used and 7.0% of part used, i.e. on average 5.0% of total loan.

6.5.2.5 Financing sources

Since the electro - locomotive plant joint venture will be developed in phases, the phase 1 over a period of 4 - 6 years to do normal and major repair will be left entirely up to the responsibility of the 3 railways. A foreign technology partner will have to be integrated on a contractual basis, not as a joint venture partner.

Therefore the financing aspects are only concerned with the re-establishment of the already existing locomotive plant at Tbilisi.

According to the cash flow calculations, the investment plan to re-start the plant in the first phase as a repair plant contains the following components:

- civil works and installations
- machinery and equipment
- working capital
- interest payments

Total investment costs for workshop rehabilitation for regular maintenance (Case 1) amount to US\$ 7.1 million of which 29 % are estimated as local currency. If the workshop capacity is enlarged in order to do additional reconstruction work (Case 2), than the investment costs come up to US\$ 9.1 million of which 31 % are estimated as local currency.

Without any foreign know-how partner as joint venture partner during phase 1, it must be assumed that only Case 1 activities can be fulfilled. Therefore financing issues are only dealing with Case 1.

Financial demand exists for the rehabilitation cost of the workshop plus the working capital (= total investment cost minus interest). The total requirement amounts to US\$ 6.768 million, of which some 30 % are estimated as local currency. That means the minimum requirement for financial support amounts to US\$ 4.7 million, assuming the local portion of 30 % can be financed locally by the railways.

One possible option to finance the minimum requirement is the EBRD loan presently under discussion (US\$ 20 million), assuming the EBRD appraisal joins our opinion that rolling stock rehabilitation is a priority.

6.5.2.6 Human resources

As compared to the former locomotive plant, in the new electro-locomotive plant a new technology has to be realised: a technology which not only refers to mechanical processes, but mainly to non-mechanical processes (organisational and pre-production processes).

As a new component, quality management must be integrated in the production process.

Personnel with the required qualifications is not readily available at present. Yet it is not feasible to give the staff an appropriate training prior to the start of the new enterprise since this would take far too much time.

The Consultants therefore suggest to hire qualified expatriate personnel with a trainer licence in all pre-production and production departments. This personnel will

- instruct the personnel in fundamentals;
- do the special introductions to the individual workplaces;
- assume a supervisor function for processes and activities in the various work flows, and
- support the Technical Director.

Depending on the size of the individual departments, 2 to 4 people of the expatriate staff have to be included in the planning for a period of at least 1 year. This personnel should occupy special positions to be created in addition to the personnel requirements (see also section 6.5.2.3), and would be dispensable once the training and support demands are fulfilled.

In the future, especially in connection with the preparation and realisation of phase 2, foreign know-how is also recommended for the function of the Commercial

Director. Under his responsibility the "Commercial Department" and the departments 'Procurement' and 'Marketing' have to be tended simultaneously.

Additionally, it is recommended to temporarily support the Marketing Department by foreign personnel, so as to effectively start the processes of marketing and sales of the enterprise's high-value products all over the CIS countries.

Further general recommendations as to 'human resources' are given in chapter 6.7.

6.5.3 Communication network

6.5.3.1 Management and ownership strategy

6.5.3.1.1 General

The area of signalling and telecommunications is an integral part of the respective railway companies and constitutes an important prerequisite for the operational and transport safety of rail operations.

The necessity of founding a company in the area of **telecommunications** results from the strategic importance of this area for the railways, which can be used by third parties, at the same time.

Telecommunication technology is the basis for the introduction and use of further modern information technologies in the railways and at the same time a basic condition for the introduction of new transport technologies. Using telecommunications sensibly and purposefully, it serves as a catalyst for increasing competitiveness of the railways towards other modes of transport.

Signalling, also an important area for railway operation, is not suitable for setting up a joint venture and is thus not considered within this report.

The following reasons lead to this decision:

- no economic significance beyond the railway operation;
- the possibilities of outsourcing it from the railways are only limited and always connected with the entire track;
- renting it out to third parties as a source of income and thus as a direct source of re-financing is practically excluded;

6.5.3.1.2 Business goals

1. Short and medium-term business goals

Related to quality

- setting up an efficient infrastructure in the area of telecommunication technology as a basis for employing modern information technologies in rail transport and further branches of industry
- guaranteeing the transport and operational safety of rail transport
- increasing the capacity of the railway network
- employing modern information technologies (e.g. enquiry services)

Related to quantity

- equipping the main lines with optical fibre cables
- installation of modern communication equipment, such as multiplexors

These goals have been determined by the potential participants and depending on the interests specified as "Must-goals" or "Can-goals" (comp. Annex 6.5-10).

2. Long-term business goals

- employing modern technologies
- providing transmission capacities for signalling technology and management
- increasing the reliability of rail transport
- decreasing energy consumption
- rehabilitation on secondary line network
- providing of telecommunication services to external partners

6.5.3.1.3 Management strategies

There are two possible management strategies for setting up a company in the area of telecommunications:

1. Companies without participation of foreign technology partners.
2. Companies with participation of foreign technology partners.

The operation of such a company without involving a competent technology partner does not make sense due to the current technological backlog and a lack of experience in marketing such services.

The foundation of such a company in the area of telecommunication technology requires a great number of preparatory measures and should therefore be conducted in the following stages (comp. Annex 6.5-11):

1st Phase - Preparatory phase

Phase 1 is the starting point of all necessary activities in the telecommunication area of the railways. Phase 1 will be implemented in two stages.

Stage 1

During the first stage, which is described in section 1.1.7.2 in detail, the main lines are to be equipped with the respective transmission technology. This forms the basic technical prerequisite for any further technical development.

The total investment volume for the three countries is approx. ECU 15 million for the first stage. The financing of this stage should be organised with the help of EU grants.

As a result of the work during the first stage, there will be a maximum of 30 channels available. The railways will use approx. 22 channels by themselves. The remaining 8 channels do not really permit to offer them to third parties for commercial use. This is also the main reason that it does not make sense to hive off telecommunications from the railways during this phase. Furthermore, the legal and organisational conditions have not yet been put into place.

Stage 2

This 2nd stage is to comprise all further planning and implementing activities coordinated by a so-called planning company for the respective railways. This type of company to be set up should at first be 100% subsidiary of the respective railway companies.

The technical standards, the interfaces, the communication and the compatibility of the hard- and software systems or further technical and organisational details have to be coordinated between all three planning companies for the respective countries.

Further tasks of the planning companies are:

- planning the future technical installations;
- controlling and organising the preparatory work;
- preparing, implementing and evaluating tenders;
- preparing the independence of the individual areas within the railways for a later hive off;
- drawing up and concluding utilisation contracts with third parties.

It is the primary task of the second stage to provide all stations with new transmission technology.

The telecommunication service remains an organisational and a legal component of the railways during the first phase.

2nd Phase - Extension phase

The primary objective during this phase is to close the ring structure of the total network by laying the second optical fibre cables and to increase the number of usable channels by employing respective technical equipment, as for instance more efficient multiplexors.

The total investment volume is approx. US\$ 80 million for the three countries.

From a technical point of view, some 1920 channels are to be available per line at the end of the second phase, which would permit a broad based rental/marketing to third parties. And through this rental/marketing activity to third parties the total investment will be refinanced.

It is necessary for the fulfilment of the tasks during the second phase to hive off the existing area of telecommunications legally and organisationally from the railway companies and to bind foreign technology partners directly to a joint venture functioning as an operating company.

This outsourcing offers the following advantages to the parties involved

- independent business policy
- favourable investment conditions and securing lucrative jobs
- handling means and resources in one's own responsibility
- flat and efficient organisation and decision-making structures
- economical use of telecommunication capacities
- more flexible reaction to the market requirements
- reducing the financial burden of the railways for communication
- lowering the individual tariffs by broadening the income.

By setting up an independent company with major participation of the railways and Western technology partners, a decisive basis is created for a competitive, private service company under majority participation of state organisations.

The present legal framework permits a maximum 49% participation of foreign firms in a company of the telecommunications sector.

6.5.3.1.4 Ownership strategies

A limited liability company seems to be the suitable company form for the foundation of the planning companies in the area of telecommunications (comp. section 6.5.1.1.5).

An independent company is to be set up in each of the countries for this purpose.

When setting up operating companies for telecommunication services during the second phase, the limited liability company, the share holder company or the limited partnership with a limited liability company as the general partner are suitable company forms.

The following table explains the recommended ownership strategy, depending on the preferred management strategy:

Tab. 6.5-10: Overview of the participation in the telecommunications area

Ownership participation	Railways	Technology partner
Management strategy		
1st Phase company without participation of technology partners	100.0 %	--
2. Phase company with participation of technology partners	min. 51.0 %	max. 49.0 %

During phase 1, the company should not be set up with participation of potential technology partners, but rather as a cooperation based on contracts. The planning company is to be set up only with the know-how of a consultant, who can already present the future technology partner at this early stage.

The following issues should be included within the framework of these contracts:

- tasks and delimitation,
- installation contracts,
- responsibilities,
- training courses,
- technical support.

Due to the period of at least two to three years to be expected for the first phase, a detailed description of the second phase has not been included in the framework of this study.

There are various technology partners world-wide who would be eligible for a participation in such a company, so that the tender should be conducted at least throughout Europe. The assessment of the offers submitted should be conducted with the help of an evaluation scheme agreed in advance. The selection of potential technology partners should be conducted primarily according to the following priorities:

- adaptability of the partner to the national interests of the railway administrations or further national or international joint-venture partners,
- verifiable availability of technological and financial potentials,
- experience in joint ventures in Eastern Europe,
- objectives and capacities of partners within the joint venture,
- competitive prices for the purchase of required equipment and for conducting training courses,
- support in providing the necessary finance.

6.5.3.2 Organisation structure

The future joint venture should be structured according to the support staff / line management system. The following structure is to be set up:

- 1st level : management department - management, accounting, controlling, personnel, organisation and EDP
- 2nd level : special departments - procurement, operation, sales

There is a depiction of the organisational structure in Annex 6.5-12.

6.5.3.2.1 Task description for the telecommunication operating company

Job descriptions have to be drawn up for both levels. These job descriptions, which are not linked to any special individual, detail the tasks and authority, the scope of work and the working time (e.g. shifts), deputy rights and deputy regulations etc. The most important tasks are briefly described in the following:

1st Level

The tasks of *management* comprise the entrepreneurial leadership of the service company for telecommunications. This includes the tasks of a technical and a commercial manager. The managing director is appointed by the partners. His scope of responsibility is laid down in the managing director's contract and requires confirmation by the share-holders' meeting.

Accounting and controlling are cross-sectional departments and thus report directly to management. The entire central accounting system is integrated into these departments. *Personnel*, as well as *Organisation* and *EDP* are also allocated to the central area.

Apart from accounting, the main tasks consist in cost management, pooling and evaluating the cost-centre, cost-type and cost-unit accounting, the planning of and check on budget plans for the respective special departments and the entire company.

2nd level

The *Marketing* department is in charge of all activities concerning market observation and acquisition of new clients. This is carried out within the allocated budget. The production department is described in Point 6.5.3.3. *Sales* is directly responsible for looking after the clients of the individual client groups.

All special departments operate on their own responsibility, whereby they cooperate on general issues. All special departments report to management directly. The head of a special department is at the same time a deputy managing director.

6.5.3.2.2 Interfaces with the railways

During the first phase of founding a planning company for telecommunications, the area of telecommunications is a legal and organisational part of the railways.

During the second phase, the railways participate as shareholders of the operating company only, based on the applicable legislative regulations.

6.5.3.3 Operating

For the development of the communication network of the Caucasian railways three steps are recommended:

1. Creation of an ad hoc group for coordination and supervision of the Multi-national communication project (see section 4.5.3)
2. Creation of telecommunication planning companies, one joint venture in each country
3. Creation of telecommunication operating companies as national joint ventures

The tasks and operation of the above mentioned companies are described in the following.

6.5.3.3.1 Telecommunication planning company

Principles

The planning company works on the basis of an outline agreement with the corresponding railway administrations. On a contractual basis the necessary tasks for the corresponding construction measures will be defined.

Main activities

The planning company works in the following planning phases:

Preparation

- agreement of activities with the involved railway departments (power supply, permanent way)

- obtaining of necessary documents (layout plans of tracks, meteorological expertise, expertise on the overhead cable pylons)
- Invitation for tenders for the projecting works and evaluation of the offers
- Invitation for tenders for the delivery of equipment and the assembly of the devices

Realisation of the construction activities

- Conclusion of contracts on the basis of the tenders
- Planning of the realisation co-ordinated with the railways
 - time schedule
 - applying for the switching off of the overhead cable
 - applying for the realisation of the needed ground works
 - applying for the preparation of the needed places for the assembly
 - co-ordination of the places and buildings or rooms for the installation of the transmission devices
 - co-ordination of the necessary works to be realised by railway staff
- Project management and controlling
- Assembly of the instruments and devices
 - laying of the cables
 - assembly of the cables
 - installation of the devices
- Inspection of the achievements of the construction company
- Financial controlling
- Handing over of the system to the railway administration

Further tasks

- Maintenance on the basis of a contract with the railway administration
 - cable equipment
 - transmission devices
 - overhead cable pylons (regarding to the cable mounting devices)
- Suppressing of interference within the cable devices on the basis of a contract with the railway administration
- Preparation of a business plan for a telecommunication operating company
 - property aspects
 - juridical aspects
 - structure of the company
 - detailed definition of the tasks
 - market analysis
 - financial planning and forecast
 - business plan
 - operational processes
 - organisational structure

6.5.3.3.2 Telecommunication operating company

The creation of a communication network of the railways is the main emphasis of the business strategy of the railways. That requires considerable investments (see section 4.2). The investments in the cable network are characterised as long-term investments. Since at the beginning of the exploitation only a small part of the transmission lines will be used by the railways, invested capital is used without producing a corresponding profit. Furthermore, the laying of cables with a lower transmission rate and a step-by-step expansion is economically inefficient.

If the railway can gain additional profit by offering communication services, this effect can be increased and an additional profit for the capital invested for the expansion can be expected. If the communication services are separated by outsourcing like it was done by Western railways and if private capital may participate at the communication infrastructure innovative investments are possible. That is possible if the operating companies are founded on the national level. To achieve this objective, the railway administrations should include in such enterprise all parts of the communication infrastructure which does not immediately serve as part of the exploitation. At the moment there aren't the juridical preconditions to do this. The alienation of State property used by railways is not admitted as long as the privatisation of railway assets is interdicted by law. Therefore at the moment it is not possible to mention a joint venture for a Telecommunication Operating Company. Since at present telecommunication services of the railway administrations are already offered, the corresponding special forms of organisations should be realised.

Therefore the following remarks about a joint venture in the field of communication correspond to a possible model, which has to be developed after the clarification of the juridical basis and a detailed definition of the interfaces between the railway and the operating company.

The main tasks of the operating company are:

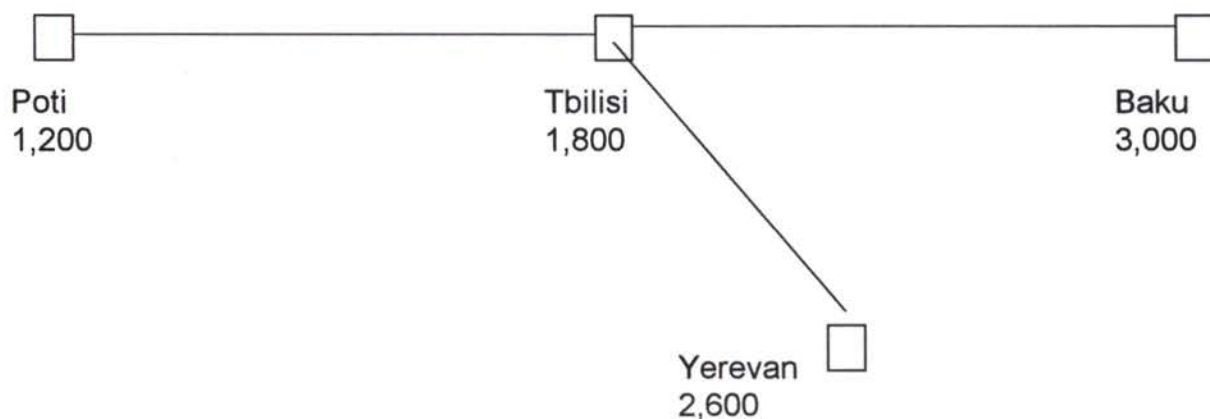
- provision of transmission lines, switching facilities and subscriber devices
- offering of communication service to third parties
- network management for different virtual networks
- expansion of the communication infrastructure
- technical maintenance and repair of the technical facilities
- guarantee of the required reliability of the systems and of the transmission security
- guarantee of the application of national and international standards and participation at their development

6.5.3.4 Financial evaluation

After completion of the investments for the second phase of the telecommunication component of the project (see 4.1.2), which will basically be achieved by the end of the year 2002, each of the three Railway administrations can lease part of the capacity of the network to their respective national telecommunication administration,

which in turn would install its own transmitting equipment and then create individual connections.

The capacity of the network will then be 1.900 channels between each of the towns along the main railway lines. Considering the relative importance of the 4 towns involved and also the capacities available for commercial use (see below), it will be possible to roughly install the following number of commercial connections:



Knowing that 60 channels are to be counted per 500 connections, the 1,800 + 3,000 = 4,800 connections on both sides of the line Baku - Tbilisi require 576 out of the 1,900 channels; this represents a portion of about 30% of the 1,900 channels available, which will most probably not be used by the railways before 2015. For the other lines, the portion will even be smaller.

The above pattern give a total of 8,600 connections, of which are

3,000 in Georgia
3,000 in Azerbaijan
2,600 in Armenia.

It is supposed that one half of the connections belong to administration and business, the other half to private households. Telephone bills (use related fees) of administration and business would be five times higher than those of private households. Therefore one can expect:

Average use related fee paid by households	60 US\$ per month net of VAT
Average use related fee paid by administration and business	300 US\$ per month net of VAT
Weighted average per connection	180 US\$ per month net of VAT

It is assumed that the telecommunication administrations pay the railways a contribution oriented to the potential receipts, which are

	20 US\$ per month per connection as a fixed fee
+	90 US\$ per month per connection, being half the average use related fee
=	110 US\$ per month per connection

This would bring the following annual receipts to the railways:

Georgian Railways	3,960,000	US\$
Azerbaijan Railways	3,960,000	US\$
Armenian Railways	3,432,000	US\$

Calculations in Annex 6.5-25 are carried out on the basis of the investment schedule given in chapter 4.2.2. The proposed EU grant of 13.4 million ECU = 14.8 million US\$ has been deducted from the investment expenses already.

Concerning the above assumptions, which are realistic, the telecommunication divisions of each of the three railway administrations will be able to achieve fairly good commercial returns on their investments, which will be paid back when the investment programme ends in 2014 (except for Azerbaijan, where it will take two more years). It can be concluded that the communication network of the railways can be financed by its commercial use. Only the negative cash flow appearing in the years during which the network is not yet operational commercially, will have to be covered by the main activities of the railways.

6.5.3.5 Financing sources

The establishment of the communication operating joint venture will take place in 2 phases:

Phase 1: Planning and preparation

Phase 2: Extension

Phase 1 will be an activity of the 3 railways alone without the organisational participation of a Western technology partner. Phase 2 will require a foreign partner as know-how partner and supplier for the joint venture. Here again by law the foreign shares are limited to max. 49 %. Since phase 1 will take 2-3 years, phase 2 will not be covered under financial sources within the scope of this Study.

The initial investment of phase 1 has already been guaranteed by a EU grant of ECU 15 million. According to our cash flow analysis, out of the total of some US\$ 72 million investment volume (phase 1 + 2 excluding EU grant US\$ 15 million) the financial

requirement of US\$ 13.7 million (Azerbaijan US\$ 3.9; Georgia US\$ 5.0; Armenia US\$ 4.8) is necessary until a positive cash flow is expected. This will happen after year 2002. Since this will be at the beginning of phase 2, a substantial financial contribution can be expected from a potential foreign joint venture partner. If not, in order to overcome the initial investment period financially, a grant or loan with the maximum amount of US\$ 13.7 million from EU or EBRD must be anticipated.

6.5.3.6 Human resources

The project structure suggested for phase I at present integrates the railway personnel with their actual qualifications.

For the implementation and operation of the railway's new communication network, however, experts will be required who are specialised in network management and technical maintenance.

For this purpose, a two-phase training has to be provided:

- Phase I will consist of the training in fundamentals. This training should be done directly on the premises of the supplier in Western Europe.
- Phase II will be a 'training on the job' with the experts from the system supplier's side in the respective countries of the railways.

During the work in the international project, further bases for the establishment of joint venture(s) will result in more detail, including requirements to be met by the personnel.

6.6 Foundation of operating companies

6.6.1 Management and ownership strategy

6.6.1.1 General

Based on the results of the traffic forecast (section 3 and 6.1), the following relations may be of importance for the foundation of operating companies:

1. Poti - Tbilisi - Baku - Turkmenbashi
2. Poti - Tbilisi - Yerevan
3. Yalama - Baku - Dshulfa

The relation No 3 was not investigated further due to the current political situation. As soon as there is a change in the political situation prevailing in the region, this relation will gain special importance. The relations No 1 and 2 are of increasing significance for the Caucasus region.

The necessity of setting up an operating company for combined transport results especially from the following facts:

- Transport of containers by rail has become competitive as compared to road transport due to the favourable tariffs of the Trans-Caucasian Logistic Express.
- The Logistic Express has met its organisational limits. If it is not possible to solve the service problems of the clients using the Express, i.e. without a solution of the service problems especially in Poti, a future of the Logistic Express is to be regarded as unrealistic.
- Without shifting competence and decentralisation of the tasks within the railways a tangible improvement of the railways' competitiveness as compared to other modes of transport is not possible.
- The market urgently needs modern transport technologies, such as the combined freight transport, according to expert opinion.
- It is imperative to include further services in the service range of the new companies.
- Any monopolisation of such services has to be avoided under all circumstances.

Due to the political situation, at least two operating companies have to be set up:

- Georgia / Azerbaijan operating company
- Georgia / Armenia operating company.

Thus, it is especially the foundation of operating companies between Georgia and Azerbaijan or Georgia and Armenia respectively which are to be investigated in line with the above mentioned main relations.

The operating companies are to be developed as the main operators of combined transport in the Caucasus region.

6.6.1.2 Business goals

Operating companies for the above mentioned main relations are set up with the following objectives.

1. Short and medium-term business objectives

Related to quality

- setting up a company for developing and organising combined transport of rail - road - sea for the respective region
- economical operation of container trains,
- providing transport services in combined transport,
- providing customer and market oriented transport service offers,
- private service provider for all forwarding and transport companies or other clients,
- comprehensive service as FOG (Free on Ground) at the receiving ports or terminals, i.e. customs clearance, transshipment onto rail wagons, rail transport to the recipient terminal, including transport monitoring, organising the delivery or picking up of consignments to or from the clients respectively, plus information, communication and billing.

Related to quantity

- Transport volume for the Poti - Tbilisi - Baku - Turkmenbashi v.v. relation of about 9,000 TEU in the year 2000 (based on the optimistic scenario of the traffic forecast)
- Transport volume for the Poti - Tbilisi - Yerevan v.v. relation of about 5,000 TEU in the year 2000 (optimistic scenario)
- Increase in the railways' share of the total transport volume in container transport from a current 20% to 40% for 1997 to 65% in the year 2000
- During the foundation and inauguration stage of the company (approx. 1 year) the break-even point should be reached. Profit cannot be expected in this period due to the transport volume which is still quite low and the necessary investments respectively (compare section 6.6.4).

2. Long-term business goals

- increasing the competitiveness of the rail transport in the TRACECA corridor as compared to main alternative transit corridors and transport modes
- offering a reasonably priced, permanent and competitive alternative, as compared to road transport
- improving the environmental quality by a broader use of a more ecological mode of transport
- reducing the overall transport costs along the main relations by creating competitive alternatives to road transport

These goals have been determined by the potential participants and depending on the interests specified as "Must-Goals" or "Can-Goals" (comp. Annex 6.6-1).

The following tasks have to be solved in the various areas in order to implement these objectives:

- sales of services of combined and multi-modal transport
- extending the service range for combined transports
- additional services for transportation of special kinds of goods
- introduction and improvement of marketing
- consistent market observation
- consulting and looking after clients
- acceptance and handling of loading units at the transshipment points
- purchasing partial services which cannot be produced with the own resources or not at competitive prices and
- organising the wholesale purchase of transport and transshipment services from the transport companies and sale to the clients

6.6.1.3 Management strategies

The participation of an experienced technology partner is absolutely necessary for setting up operating companies, especially in combined transport because of

- completely new transport technology for this market,
- complexity and difficulty in the organisational structure and the organisational implementation of the tasks and
- lacking experience of the local partners in the important field of marketing

Thus, the further explanations are based exclusively on this management strategy and the investigation of other forms without technology partners was dropped on purpose.

Numerous discussions have been conducted with potential European technology partners within the framework of the investigations conducted. Agreement was achieved as a result of these meetings on all significant requirements of the management strategy. There are the following premises which apply to the participation of foreign technology partners in an operating company:

- employing an independent managing director furnished with all the necessary competencies
- accounting and cost accounting according to national legislation and Western standards
- high degree of transparency in the business activities
- full competence of decision for the technology partner in the day-to-day business
- a company structure, which excludes blockades by individual partners, on the one hand, and which guarantees a high degree of interest in the company and its successful development, on the other hand.

Regardless of the premises, the foreign technology partners demand a majority share in the operating company to be founded as a necessary basic prerequisite. This, however, does not necessarily extend to the profit distribution.

During the talks held within the framework of this project with potential technology partners (combined transport companies and international forwarding companies with world-wide experience in combined transport) the discussion centred on the basic interest of these companies in such a cooperation and the framework conditions for an involvement. Several companies voiced such an interest. A tender throughout Europe is suggested for selecting the suitable technology partner.

The participation of only one technology partner in the two operating companies is recommended. This reduces the friction losses between the two operating companies and increases the synergy effects (e.g. identical personnel for the same tasks) and facilitates a possible fusion after a détente of the political situation.

The selection of potential technology partners should be conducted first and foremost according to the following criteria:

- references and know-how in operating block trains in international multimodal transport chains, i.e. verifiable evidence of technological and financial potential,
- connections with Western European and CIS railways, shipping and forwarding companies,
- experience with own firms or affiliated companies in the countries of the CIS and Eastern Europe,
- experience in world-wide marketing for multimodal transport technologies
- existence of a broad network of branches, offices and agencies especially in Western Europe.

6.6.1.4 Ownership strategies

Two alternative ownership strategies are possible per relation within the above described management strategies:

1. Joint Venture with technology partner with majority share in the Joint Venture
2. Joint Venture with technology partner without majority share in the Joint Venture.

The second strategy is only to be considered if the first one proves politically not feasible. Even in that case, all the premises described in the following have to be heeded. However, it should be assumed that the necessary success can only be achieved with the first strategy. That is why the following explanations focus on the first ownership strategy only.

It is also very important that all parties involved in the transport chain have an interest in the functioning of this new company, so that any disturbing measures may be minimised. This may be secured best by a participation in the economic success of these companies. A differentiation has to be made between compulsory and optional participants:

Compulsory participants are participants which are indispensable as partners for the marketability of the new technology within the framework of the joint venture to be founded. These companies need to become participants of the company primarily due to their position and significance for further transports (1st company Poti - Baku, 2nd company Poti - Yerevan).

Compulsory participants are : Poti Port (1. + 2.)
GRZD (1. + 2.)
AGZD (1.)
ARM (2.)
technology partners (1.+2.).

Optional participants are participants who should sensibly be included as partners for the marketability of the new technology within the framework of the joint venture and for a higher acceptance of the new firm, as these companies are able to influence the further transportation decisively. An integration by means of contracts is also possible as an alternative.

Optional participants are : Baku Port
Caspian Shipping Company.

The following approaches were investigated for the operating companies:

Tab. 6.6-1: Example for participation in the Poti-Tbilisi - Baku operating company

Ownership participation	Poti Port	GRZD	AGZD	Baku Port	Casp. Ship. Comp.	Technology partner
Management strategy						
Technology partner - with majority share	9.8%	9.8%	9.8%	9.8%	9.8%	51.0%
- without majority share	14.0%	14.0%	14.0%	14.0%	14.0%	30.0%

Tab. 6.6-2: Example for participation in the Poti - Tbilisi - Yerevan operating company

Ownership participation	Poti Port	GRZD	ARM	Technology partner
Management strategy				
Technology partner - with majority share	16.0%	16.0%	16.0%	52.0%
- without majority share	22.0%	22.0%	22.0%	34.0%

The profit distribution should be conducted independently of the shares in the company (see 6.6.1.5).

6.6.1.5 Company profile

The "limited partnership with a limited liability company" as the general partner is one of the most tried and tested company forms for combined transport in Western Europe, thus it is suggested as the corporate form. The '**Company for Combined Freight Transport Ltd.**' is the general partner and owner. It is an independent company which is personally liable within the limited partnership.

Fig. 6.6-1: Structure of the Company for Combined Freight Transport Ltd. in a limited partnership



The limited partners, comprising domestic and foreign interested parties, such as forwarding and shipping companies etc., are shareholders of the entire company according to the amount of their limited partner shares. The limited partners are liable to the amount of their individual share, depending on the overall finance requirement and the number of limited partners.

Advantages for the Ltd. company shareholders

- share of profits
- concentration on the core business and improvement of the interfaces to the other participants in the transport chain
- influence on the implementation of a new transport technology in the region
- secured participation in the transport process and thus secured income
- gaining transport volume from road to rail
- securing further income by the railways as a foundation for re-financing investments in the area of infrastructure and the rolling stock.

Advantages for the limited partners

- possibilities to use complex and inexpensive solutions in the combined transport, including the services of the ports, the railways and the Caspian Shipping Company,
- strengthening or reaching competitiveness towards competing corridors,
- discounting of services, which are provided by the operating companies towards firms who are not limited partners
- possible types of discount:
 - discount on each TEU-unit
 - quantity scale discount through a bonus system at the end of the year

The first profit distribution should only be made after a stable business operation has been established, at the earliest, however, as of 1999.

The following profit distributions should be restricted to a maximum of 50 % of the total profits. The remaining part of the profits should be used as reserves or for further investments.

Profit distribution

Shareholder - staggered repayment of the previous expenditure of the Ltd. company shareholder

Limited partner - payment depending on the number of limited partners and the amount of their shares

The paid sum to the limited partners should be 50 % of the total distributed profit (comp. Annex 6.6-2).

6.6.2 Organisational structure and interfaces to the railways

6.6.2.1 Organisational structure

The companies to be set up are controlled by the following bodies:

Shareholders' assembly

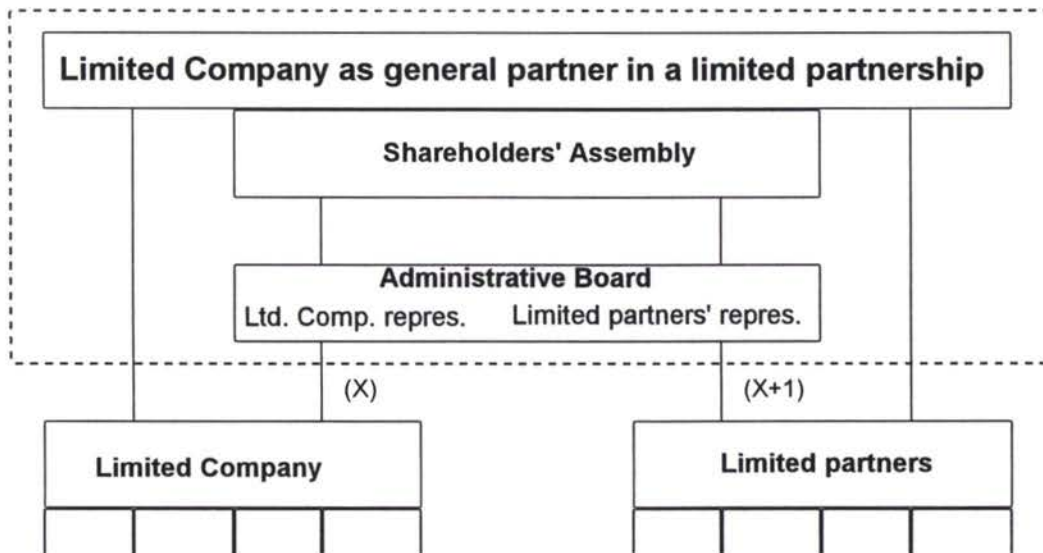
The shareholders' assembly is the supreme body of the company. It decides on the annual statement, the appropriation of the year's result as well as the administrative board and management. Furthermore, it has the authority to decide on all matters which go beyond the ordinary business of the company, in so far as these matters do not fall into the responsibility of the administrative board.

Administrative board

The task of the administrative board is to monitor management with regard to the purpose of the company and company policy. Furthermore, the administrative board appoints committees for consulting management, at the proposal of management, and decides on the admission and discharge of limited partners.

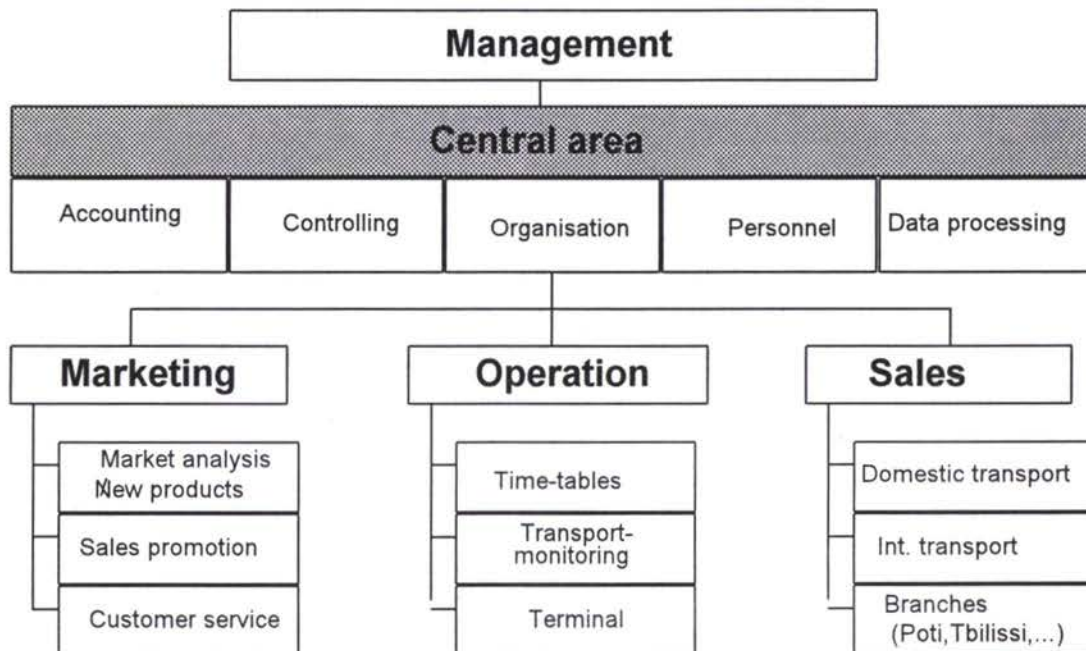
This results in the following overall structure:

Abb. 6.6-2: Bodies of the Company for combined freight transport Ltd in limited partnership



The organisational structure of the companies to be set up should be the following:

Fig. 6.6-3: Organisational structure of the Company for combined freight transport Ltd. in limited partnership



Branches

Branches or agencies for the Poti - Tbilisi - Baku - Turkmenbashi relation are to be set up in the following towns and cities:

- ◆ Poti
- ◆ Tbilisi
- ◆ Gyandsha
- ◆ Baku
- ◆ Turkmenbashi

A forwarding company located in Tashkent is to be commissioned with agency tasks and is to take over the handling of any transports from and to Central Asia.

Branches for the Poti - Tbilisi - Yerevan relation are to be set up in the following towns and cities:

- ◆ Poti
- ◆ Tbilisi
- ◆ Yerevan

Legal seat of the company

The location of the company headquarters should not be chosen on the basis of functional aspects, but rather on legal and commercial grounds.

From a legal point of view, there are only some restrictions as to the location, whereby the framework conditions of legislation would rather favour Georgia and Armenia.

From a commercial point of view (conditions for setting up a company, amount and type of corporate taxes, level of wages and salaries, qualification level) the company's seat should be in Georgia or Armenia. The main reason for this is the possible tax exemption or tax reduction of up to five years. In Azerbaijan, the taxation of company profits has been 32% since April 1997, regardless of the legal structure.

Considering the fact of the close professional and personal interweaving of the two companies, a company seat in Georgia is suggested, in view of the political framework conditions.

Tbilisi is suggested as location for the headquarters of the companies for reasons of better communication and infrastructure as well as closeness to the railways, the Ministry of Transport and other relevant authorities.

6.6.2.2 Interfaces to the railways

The railways have to conclude working and sustainable agreements with all modes of transport (node agreements), or to adapt the existing ones to the new requirements of the market.

The authority for allocating the container positions on the trains has to be passed on to the operating companies. The operating company, on the other hand, shall pay in advance for availing of the services provided by the railways.

The railways render services to the operating companies which are on time and live up to the quality standards. In the case of non-compliance, penalties are agreed. The trains of the operating companies are to be given priority treatment in handling, trajecting etc. The railway administrations operate the trains regardless of the degree of utilisation, according to a fixed timetable, with priority attached to a high degree of punctuality and with accompanying guards.

In the case of a terminal operated by the railways, they take over the loading and unloading as well as the storing of the containers and the repair, if necessary.

The railway administrations provide wagons in the agreed quantity and of a high quality for the trains.

6.6.3 Operating

The tasks of operation derive from the task/the business filed of the operators and the service company for the multimodal transport.

These tasks correspond to the railway sections Poti - Tbilisi - Baku and Poti - Tbilisi - Yerevan and to the ferry line between Baku and Turkmenbashi. The Operating Company offers the transport of containers between the port of Poti and the reception terminals as a base service to any customer.

The base variant consists of the following spectrum of services:

- export, import, transit customs clearance,
- booking of places on the container wagons of the logistic trains,
- loading of containers on railway wagons,
- transport by railway to the destination terminal respectively from the origin terminal to the port of Poti including transport control,
- transport guarding,
- complex information for customers
- accounting with ports, railways, road transport companies and other service enterprises.

The Operating Company concludes contracts about the provision of the corresponding container wagons and about the operating of the logistic train with the involved railway administrations. The logistic train operates 2 to 3 times a week on the above-mentioned relations depending on transport demands.

As additional services are offered:

- trucking within the range of the destination terminal
- transport to terminals in Central Asia or other third countries
- storing and return of empty containers
- provision of empty containers for dispatchers in the Caucasian republics
- repair of empty containers
- transshipment of containers owned by shipping companies to railway containers or corresponding freight wagons
- issuing of customs documents.

Not all of these services should be carried out by own staff. At least at the beginning some services like trucking, transshipment and storing of containers (craning), repair of containers etc. should be bought. A decision concerning the realisation of these services under own control should be made at some later time depending on the development of the business and the local conditions.

A list of services and prices serves as basis for the operation. On its basis the contracts with customers are concluded, which don't have a direct contact to the railway administrations.

The Operating Companies perform marketing, advertising and sale of the services in the three Caucasian countries and in foreign countries. On contractual basis they could use services of a Western firm for marketing, advertising and sales in Europe.

Agreements about tariffs and rates for handling, booking, carrying, delivery, storing, transshipping, transport documents, transferring, taking over, formal procedures in the case of freight damage will be concluded with railway administrations, ports and shipping companies.

An operative planning of the services is made for every train and agreed with the partners.

To guarantee a frictionless transit of the containers the local operating staff should closely collaborate with the customs authorities in the ports, border stations and terminals on the basis of agreements (see below).

After the successful installation of the logistic trains and with increasing numbers of containers to be transported the operating companies should try to reach larger agreements with the ports and the railways. These agreements should provide for

in the ports

- offering reduced prices for transshipment and storage of containers
- priority of the container transshipment with regard to customs procedures
- information about arriving containers and planned arrival of ships in advance

*in the railway
administrations*

- renouncement of invoicing demurrage for the wagons.
- providing trains according to an optimal schedule with regard to the customers
- providing locomotives for different train loads depending on the number of containers to be transported (300, 500, 800, 1.200 t)
- information about the arrival of wagons with containers in the terminals
- long-term agreements on tariffs, at least for a one-year period
- transport of high-quality goods in conventional wagons in the logistic trains, if a full use by containers can not be achieved

*In the shipping
companies:*

- reduced tariffs for the transportation of containers on the ferries
- priority of the transport of containers
- information about the arrival of containers on the ferries

6.6.4 Financial evaluation

The financial viability of private joint ventures in the field of container train operation is examined below.

One train has 30 wagons with a carrying capacity of 3 TEU each. There is a varying degree of utilisation of the capacity of the train, an average of 75% being supposed. In the direction Yerevan or Baku to Poti, only 25% and 22% of the containers are loaded at an average, respectively. The total number of containers is about the same in both directions.

Container trains between Poti and Baku (Turkmenbashi)

Distance Poti - Baku about 900 km.

Average duration of a round trip at present conditions between Poti and Baku: 8 days (of which one way Poti - Baku 5 days); between Poti and Turkmenbashi: 8+3=11 days.

Average duration of a round trip with the new operating company: 4 days (of which Poti - Baku 2 days).

According to the traffic forecast in section 3.1, container traffic by train will be as follows, the mean between the optimistic and the pessimistic scenarios being taken:

Tab. 6.6-3: Container traffic by rail between Poti and Baku(Turkmenbashi)

	Nr. of TEU per line per year			of which by logistic express per year (90%)
	Poti - Baku	Poti - Baku - Turkmenbashi	Total	
1998	1,202	359	1,561	1,404
2000	2,219	897	3,116	2,804
2010	4,723	1,466	6,189	5,570
2015	5,904	1,833	7,736	6,962

Container trains between Poti and Yerevan

Distance about 650 km.

Average duration of a round trip at present conditions: 10 days (of which Poti - Yerevan 6 days).

Average duration of a round trip with the new operating company: 4 days (of which Poti - Yerevan 2 days).

According to the traffic forecast in section 3.1, container traffic by train will be as follows, the mean between the optimistic and the pessimistic scenarios being taken:

Tab. 6.6-4: Container traffic by rail between Poti and Yerevan

	Nr. of TEU per line per year	of which by logistic express per year (90%)
1998	2,323	2,090
2000	3,379	3,041
2010	6,370	5,733
2015	7,963	7,166

Financial calculations

Financial calculations are carried out in Annex 6.5-1 for the Georgian - Armenian and in Annex 6.5-2 for the Georgian - Azerbaijan company. An important parameter for judging the viability of the private operation is the price at which the railways will be willing to move the wagons in block trains and according to a fixed time schedule. Discussions held with the railway administrations showed that the container unit (TEU) should be the contractual basis, and not the complete train. The calculations in the annexes examine the cost situation of the railways and then establish the basic prices which the private companies would have to pay to the railways for one round-trip per TEU, which are (in rounded amounts) given in table 6.6-5.

Note: For bringing the containers (on wagons) up to the port of Turkmenbashi and returning the same number from there, loaded or empty, the Georgian - Azerbaijan company will have to add to the price up to Baku a charge of 340 US\$ + 10 US\$ per TEU, representing the price for the round-trip of half a wagon on the ferry plus port transit. These costs of continuing the operation beyond Baku and the corresponding receipts are not included in the calculation tables of Annex 6.5-2, as the difference between them will be near zero (apart from a commission from Caspian Shipping Line, which will cover the extra costs)

Tab. 6.6-5 Possible prices paid to the railways (net of VAT)

	For containers (incl. empty return) US\$/TEU per round-trip	Average under consideration of exist. loading rates for returned containers US\$/TEU per round-trip
between Poti and Yerevan	675 - 22* = 653	731 - 22* = 709
between Poti and Baku.	1,017 - 33* = 984	1,092 - 33* = 1,058

* saved direct costs

These prices correspond to the present tariff levels (however after deduction of a portion of the direct costs which the railways will save due to improved transport management by the operating companies). It is thought that the railways should not seek business by lowering the tariffs, but rather by improving their service. As shown in other parts of this study (chapter 5), there is even a need for price increases, if the railways are to remain financially viable. Recent experience has also shown that the railway administrations are rather reluctant to operate the logistic express on a discount basis.

The rationale for the private operating companies will therefore be to offer the client a service which would be more reliable and faster than the present one. The operating companies would reduce the extra costs which the client now incurs on top of the

transport price (time related costs, demurrage, road fines and unofficial expenses); part of these savings being for the operating companies and part being for the client. At present, road fines and unofficial expenses alone amount to at least 100 US\$ per trip per TEU according to information received, whether the transport takes place by road or rail.

Considering what the transport of a TEU costs the client under the present conditions, the prices which can reasonably be claimed by the operating companies are as follows (per TEU, per round-trip):

Tab. 6.6-6: Possible prices of operating companies to clients (net of VAT)

	For containers (incl. empty return) US\$/TEU per round-trip	Average under consideration of exist. loading rates for returned containers US\$/TEU per round-trip
between Poti and Yerevan	820	888
between Poti and Baku	1,150	1,234
between Poti and Turkmenbashi	1,150 + 350 = 1,500	1,234 + 350 = 1,584

Above prices do not include handling and other side costs which are the same for railway transport and for truck transport. They also do not include the costs of delivery to the final destination (which have however been taken into consideration in the comparison of the costs to the client).

The establishment of the operating companies requires little investment costs. As payment in advance is now common practise, working capital for one month's expenses is sufficient. Total funds needed at the beginning have been calculated as follows:

Tab. 6.6-7 Funding requirements for the operating companies

Joint venture	Georgia / Armenia US\$	Georgia / Azerbaijan US\$
Office equipment	100,000	100,000
Computer system	50,000	50,000
Cost of establishment	50,000	50,000
Working capital (1 month's expenses)	138,957	142,745
Less net profit first year	- 151,594	- 16,494
Total funding requirements	187,363	326,251

These requirements, which should be covered by share capital, will be paid back by the profits (after profit tax) within one year for the Georgian - Armenian company and after 2 years for the Georgian - Azerbaijan company.

The private operating companies are therefore financially viable under the assumptions made.

In the pessimistic traffic scenario, both operating companies would still have comfortable profits.

6.6.5 Financing sources

In general, the establishment of two different operating companies requires rather little financial investment compared to the joint ventures in the infrastructure field.

The investment volume contains

- office establishment and equipment
- computer system
- working capital

The total investment costs amount to US\$ 339,000 for Georgia/Armenia J. V. and US\$ 315,000 for Georgia/Azerbaijan J. V., respectively. It can be expected that the initial investment costs plus possible start losses (year 1-3) will be covered by the shareholders. According to our cash flow analysis, the Georgia /Armenia J. V. will expect a positive cash flow already after one year of operation, the Georgia/Azerbaijan after two years of operation. According to the traffic and tariff assumptions made, the two joint ventures are financially feasible.

The suggested organisational structure differentiates between core shareholders and non-core shareholders. The suggested type of organisation is open for further entries of interested companies as non-core shareholders at some later time. This is a flexible and very economic strategy. It is assumed that the core shareholders cover the initial investment costs.

Since the foreign technology partners are seeking a 51 % (and up) majority, the financial contribution to the shareholder equity will be accordingly. An additional funding need results from the position of a "general manager", who should be solely in charge for the two joint ventures and should come from a western, well experienced cargo transport or forwarding firm with an international background. The personnel cost is estimated to be US\$ 120,000 p.a. We consider such a position as well as the background qualification of the person described as vital for the success of the project.

6.6.6 Human resources

The commercial success of the operating companies very strongly depends on the quality of the company's top management.

The company's management and the central services are areas where quite a lot of qualifications and experience must be concentrated which, even compared to the present circumstances, are partly new.

With regard to the management and the staff for international marketing, this is valid, amongst others, because of the following:

- knowledge of marketing and market(s);
- management qualities;
- comprehensive knowledge of countries;
- knowledge of internationally used languages;
- knowledge of logistics;
- experience in the forwarding business;
- knowledge of economics and law of contract;
- a good understanding of what is implied in rendering services;
- quality of communication.

In this respect decisions as to personnel, especially in the periphery of management, are of vital importance to the companies' commercial success.

The staff in the department dealing with orders and making arrangements for transport and the staff in the decentralised areas must be experts in service. Apart from their actual "skills" (e.g. accounting), an understanding is required what 'service' means, flexibility in thought and action, ability to communicate and team spirit that is most in demand.

Deficits in those fields directly influence the operating results in a negative way.

It is recommended to preferably choose personnel that has a motivation of its own, and is very open during the enterprise's start-up phase to the ideas personnel may offer regarding the development of the company and the respective field of activity.

Expatriate personnel is required only for the 'Managing Director' function, i.e. both operating companies can be managed by just one Managing Director.

The person to be eligible must be a high-calibre expert possessing all the knowledge and experience mentioned afore. This person will also be responsible for choosing, training, and directing the local personnel.

Personnel working in the decentralised functions, in particular in the fields: administration, marketing, and service must have a command of foreign languages apart from the above mentioned qualifications.

Requirements as to the number of personnel are described in section 6.6.2.

6.6.7 Border control and customs procedures

One of the essential objectives of the parallel realised TRACECA project "Trade Facilitation, Customs Procedures and Freight Forwarding" is the problem of border control and customs procedures in freight traffic. Within the project the conditions of the infrastructure, the juridical and administrative principles, the applied documents and procedures will be examined in detail and recommendations for the improvement, the unification and the harmonisation with international standards are given.

Within the current project the problems of border control and customs procedures will be examined insofar as they are significant for the activity of an operating company working in the combined transport and for the running of special container trains between Armenia and Georgia as well as Georgia and Azerbaijan.

At the moment the conditions of the infrastructure for the customs clearance at the railway border crossing points are in a sufficient condition to carry out customs procedures for the actual transport volumes without delay. In general the offices of the local customs authorities are badly equipped. There is barely computer technology. If computers are available, they are only used for data collection. The bad and unreliable communication connections to most of the controlling points are a serious problem. The telephone network is unreliable and in a desolate condition. At the moment it is not (or only in a very limited way) suitable for data exchange via EDI.

The current border and customs control procedures are complex and labour intensive and lead often to delays and increased transport costs. One of the major problems is the requirement to produce complete clearance documentation packages, even so the cargo is not being cleared.

The required documents for the customs clearance of export, import and transit goods are similar in the three countries, but there are also differences. The greatest part of the applied documents is specific for the corresponding country and as a rule they do not correspond to the internationally used formats. Because of these non-standardised documents, delays often happen during the clearance at the border crossing points.

Another problem is that the issuing or the processing of the documents only starts at the moment when the goods have arrived. This leads to increased transport times and to a delayed delivery of the freight.

Armenia, Azerbaijan and Georgia are planning to introduce a computerised customs clearance system. In this context they intend to introduce the system ASYCUDA. In selected locations in Armenia and Georgia the first computers were installed in the form of pilot projects. At the moment Azerbaijan examines the conditions and prerequisites for the introduction of this system.

The border control and customs clearance represent an important interface within the whole transport process, which can have a significant influence on the quality and the duration of transport. At the moment this interface is often the reason for delays of transport in border crossing freight transport. Therefore an operating company for special logistic trains must create all operational and organisational preconditions within its activity, which exclude almost all potential sources of transport delays during the border control and customs clearance in the transport process. At the same time the company must be able to offer their clients all necessary services with regard to border control and customs procedures.

In the following the actual situation will be analysed with regard to the most important interfaces (border control/customs clearance) of the transport process and recommendations will be given for necessary changes. It will be taken into account, that principal recommendations for infrastructural, juridical and organisational improvements and for the unification and the harmonisation of the documents to international standards were worked out within the above-mentioned project "Trade Facilitation". Because some of these recommendations hardly will be realised in the short term, the following proposals are made with regard to measures, which an operating company should realise immediately after the beginning of its activities.

The most important interfaces of the border control and customs clearance within the process of container transports between Poti and Baku/Turkmenbashi as well as between Poti and Yerevan, respectively, are:

- import of the containers via the port of Poti and hand over to the operating company for further railway transport
- customs clearance of containers with export goods at the client's warehouse
- border control and customs clearance at the border between Georgia and Armenia and between Georgia and Azerbaijan
- clearance of transit containers in the west/east and the east/west traffic at the interface between railway and ferry in Baku
- receiving import goods after customs clearance at the customs terminal or at the territory of the consignee

Customs clearance and border control at the port of Poti

At present the customs clearance of containers arriving at the port of Poti leads to significant delays of the transport process. While an arriving ship is unloaded in general within 1 - 2 days, the customs clearance takes another 2 -7 days. In the above mentioned study "Trade Facilitation", recommendations are given for infrastructural and organisational improvements in the process of customs clearance at the port and for unification and simplification of the procedures and documents. For the successful work of an operating company of a Logistic Train improvements are necessary in the short term to offer the transport clients corresponding services in this area.

Although the customs clearance and border control of the containers at the port are carried out prior to the transportation of the containers in the Logistic Train, they should be an essential part of the service spectrum of an operating company, because offering a significantly improved service in the sensible field of customs clearance and border control increases the competitiveness of the Logistic Train in comparison to other transport modes and the attractiveness for the transport clients. Furthermore a better and more continuous utilisation of the train can be guaranteed.

For the realisation of the necessary operative activities in the process of the customs clearance and border control it is recommended to occupy an experienced employee in Poti, who should work as a customs broker. As an alternative in the initial phase it is possible to use the services of a local forwarding agency on the basis of a contract. At the moment the bigger international forwarding agencies in general organise the customs clearance and border control by themselves and hand over the cleared containers/goods to the railway, while clients having only a few or not regularly goods will use the corresponding services of the operating company.

For the acceleration and the optimal (time-wise) organisation of the clearance process, it is recommended that the operating company of the Logistic Train concludes an agreement with the port of Poti and the local customs authorities. At the moment this agreement should be based upon the actual administrative and juridical realities, because at the moment it is barely possible to carry out necessary changes in legislation for the simplification of the procedures and documents. An essential content of such an agreement between the three sides must be an agreed schedule for the customs clearance of the containers arriving at the port of Poti. The schedule must take into account both the dates of the arrival of the ships and the time of departure of the Logistic Trains according to the time table. In the initial period it is essentially important for the operating company of such trains, to guarantee a customs clearance which is orientated to the time of departure of the train. Since in the initial period only 2 train departures a week are planned, a non-achievement of the next scheduled departure could lead to an additional delay of these containers of at least 3 - 4 days. In this case a transportation of the containers by road may lead to a significant gain in time, which would limit the competitiveness of the Logistic Train.

The careful inspection of completeness and correct issuing of the freight, the customs documents and other necessary documents for every container to be transported has a high priority for the activity of the operating company at the port of Poti. To avoid resulting delays of the transport of the whole train at the border crossing points (see below), consignments with non-complete or not correct documents are to be excluded from the transportation in the Logistic Train.

Customs clearance of export containers at the consignor's warehouse

In all three countries containers, which are determined for export, are loaded in presence of the customs authorities at the consignor where the containers also will be sealed.

The issuing of the customs documents is made either by the local customs authorities or by an agent, a so called 'declarator' on the exporter's behalf. Exporting firms, forwarding agencies or other service companies can function as declarators. To get the authorisation to work as a declarator, it is necessary to have a corresponding licence issued by the supreme customs authority.

In the case of export of goods, it can be assumed that the operating company takes over containers from the consignor, which are already cleared by the customs. But the company should make sure by corresponding contractual agreements with a declarator, that if necessary it is possible to offer the client the issuing of the customs documents as an additional service. If the corresponding demand exists the operating company should try to get a licence as a declarator and offer the client the services of a customs broker.

Similar to the procedures in the port of Poti, it is important to examine the completeness and correctness of the documents when taking over the containers from the client.

Border control and customs clearance at the border Georgia / Armenia and Georgia / Azerbaijan

The border control and customs clearance of goods transported by container trains at the border Georgia /Armenia and Georgia / Azerbaijan is performed at the border stations:

- Gardabani (Georgia)
- Beyuk Kyassik (Azerbaijan)
- Sadakhlo (Georgia)
- Ayrum (Armenia)

At all four stations the offices of the customs authorities are located in rooms rented from the railways which are near to the border marshalling yards. The offices are badly equipped, but correspond in general to the demands of a trouble-free customs clearance. The insufficient communication facilities are the biggest deficit. Nevertheless the customs authorities at the railway border crossing points are in a relatively better situation than the customs at the road border points because they can use the internal communication facilities of the railways. At the moment non of the four customs points is equipped with computers. For all four customs offices it is especially important to create stable and reliable communication connections. They are an essential precondition for the introduction of the computerised system ASYCUDA. Up to the introduction of the system ASYCUDA, it is possible that the customs authorities use the computerised information system installed for the Trans-Caucasian Logistic Express. The central customs authorities in Georgia and above all in Azerbaijan have expressed their interest in it. The operating company could conclude a corresponding agreement with the customs authorities.

The border control and customs clearance at the railway border crossing points between the involved countries are an essential interface in the transport process of the Logistic Trains and therefore may significantly influence the activity of the operating company and the quality of the offered service. The keeping of the schedule and the guaranteed times of transportation depend considerably on the frictionless clearance at the border crossing points.

The customs clearance during the import, export or transit of containers on the mentioned border stations consists of the following activities:

- physical inspection of containers and seals
- inspection of the customs and transport documents.

At the border stations the customs authorities do not issue new documents for import, export or transit goods. For every consignment the customs issue a 'transit note' containing all important data (consignor, consignee, type of good, number of container, number of consignment note). These documents are manually issued. Therefore the duration of the clearance process is considerably determined by the number of consignments in the train. The normal duration of the border control and customs clearance including the issuing of the mentioned documents amounts from 1 hour to max. 2 hours. During the test phase of the Trans-Caucasian Logistic-Express between November 1996 and February 1997 there occurred no delays of the trains caused by border control and customs clearance.

In the case of irregularities (missing documents, broken seals etc.) the central customs authority is informed. After consultations with the sender, the local customs authorities at departure station respectively at the entering border station, they will decide how to proceed and give orders to the border crossing point. If problems can not be resolved immediately, the corresponding wagon will be excluded from the train. Since irregularities which happen at the borders are resolved in any case through the central customs authorities, it is recommended that the operating company concludes an agreement with the customs authorities to establish permanent contact persons in the central, which are exclusively responsible for the solution of all questions with regard to the operation of the Logistic Trains. At least permanent, unbureaucratic information connections between the operating company and the customs should be agreed.

Presently the main reasons for existing delays during border control and customs clearance are incomplete or incorrect customs or freight documents. Therefore it is especially important that the operating company examines the completeness and correctness of the documents of every consignment at the departure location.

After the customs offices at the interfaces have been equipped with computer technology, it must be guaranteed, that they have a direct access to the computerised logistic information system of the operating company. This would allow the transmission of the necessary documents to the customs prior to the arrival of the train.

and thus the issuing of the documents before the arrival of the train and would therefore reduce the train stop at the border stations. Until the customs offices are equipped with computers, the operating company could conclude agreements with the railways to transfer these kind of information to the customs via the computerised information system of the railways.

In the past significant delays during customs clearance happened at the border between Armenia and Georgia because the Armenian customs issued the documents in Armenian language. Until the introduction of unified documents and procedures agreed between all involved sides, it has to be guaranteed that freight and customs documents for transports between the involved Caucasian republics are exclusively issued in Russian language.

Clearance of transit containers at the interface railway / ferry Baku

The technical and technological processes at the ferry port of Baku including the existing bottlenecks are described in detail in chapter 7. At the moment the loading and unloading of the ferries is significantly delayed because of the simultaneously performed border control and customs clearance of passengers, trucks and railway wagons. The reasons for this situation are the unfavourable local conditions but also the insufficient organisation of border control and customs clearance. Originally, the ferry port was planned exclusively for the transfer of railway wagons in domestic traffic. The infrastructural preconditions are extremely bad for the actually very high and furthermore increasing share of road vehicles which leads to significant delays in the whole process of the ferry clearance.

For incoming traffic customs clearance is performed on the ship, for outgoing traffic immediately before the loading on the ramp. In railway transport only the seals are inspected at the ferry terminal.

To simplify customs procedures for transit transports Georgia, Azerbaijan, Uzbekistan and Turkmenistan have concluded an agreement in 1996. This agreement regulates the unhindered transit freight transport between the involved countries.

Customs clearance of import containers

Receiving import containers from customs is a process which is performed after the transportation by the container train. Irrespective of this the operating company must be interested in a frictionless organisation of this process because it influences the transportation time of the containers.

To clear import containers the consignee submits a customs declaration together with the necessary complementary documents to the national customs authority. This declaration is issued analogously to the export either by the customs or by an authorised service company on the importer's behalf. The physical inspection and the release of the freight for unloading are differently regulated in the individual countries. In Azerbaijan, after submitting the necessary documents and the clear-

ance by the customs authority the container, which is accompanied by customs, is transported to the consignee where the goods are inspected during unloading. In Georgia the release and the inspection of the import containers are performed exclusively at the corresponding customs terminals. In Armenia both variants are practised. As a rule the customs authorities guarantee that the goods are released within 24 hours after the submitting of all necessary documents.

The operating company should take advantage of the services of local forwarding agencies on a contractual basis to guarantee the necessary services for the clients with regard to receiving of containers from customs.

6.7 Human resources development

6.7.1 Requirements

The comparison between actual situation and requirements to be conditioned by future fields of tasks and work structures as regards human resources results both in quantitative and qualitative differences which, by means of appropriate personnel development measures, have to be diminished in the short run and eventually be eliminated altogether.

As regards the quantitative differences, there will surely be no solution in the short run. Still, it will be impossible to avoid such a development. Seen in the long run, the number of personnel as compared to the volume of work is contradictory to the development (progress) of the railways in terms of economy, even if the transport performance of the railway will have recovered from its present, low level. Even when proceeding from the most optimistic variant of each of the forecasts, a reduction of personnel is inevitable under aspects of economy and organisation.

For the new structures (see sections 6.5 and 6.6) the quantitative human resources are dimensioned in a way to allow an optimum of modern, organisational structures, working methods, and management strategies. For the railways (and especially for their administrations) a process with this objective must immediately get under way.

The qualitative differences are manifold, but in terms of focal points only related to:

- thinking structures, planning structures, and work structures oriented to market economy;
- modern management and working methods, and
- special (new) technical knowledge.

6.7.1.1 Market economy-oriented thinking structures, planning structures, and work structures

The basis for these new qualifications is, in the first place, a new understanding of

- the typical "service" character of what the railway offers, and
- the role customers play in competition.

This process of reorientation is to comprise, according to the 'top-down' principle, all railway staff and the staff of the new enterprises in the railways' periphery.

Taking this as a basis, different capabilities will be required for different target groups. The most important focal points of these capabilities with their respective priority as regards the improvement of competitiveness are listed below.

In doing so, the Consultants proceed from the assumption that in view of the present staff situation staff already available are to be (further) trained for the new conditions.

	<u>Capabilities</u>	<u>Target group</u>	<u>Priority</u>
1	<i>Marketing</i>		I
	<ul style="list-style-type: none"> ■ market analysis, quantitative (How much service does the market require?) ■ market analysis, qualitative (Which type of service is called for by the customer potential?) ■ develop flexible aims and strategies (What is it exactly that the department / the enterprise wants to achieve within the next years, and how?) ■ concrete measures for <ul style="list-style-type: none"> • supply planning (which products, which services?) • marketing planning / sales strategy (How will sales actually be done?) • public relations (How does the enterprise inform the public, how does it present itself?) 	<ul style="list-style-type: none"> - managerial personnel in planning - management trainees for planning and production - commercial department 	
2	<i>Cost accounting and controlling</i>		I
	<ul style="list-style-type: none"> ■ profitability calculation (How much will a service cost?) ■ budget planning ■ controlling 	<ul style="list-style-type: none"> - managerial personnel in planning - management trainees for planning and production - commercial departments 	
3	<i>Customer service</i>		I
	(bases and measures for competitive work by means of additional quality)	<ul style="list-style-type: none"> - managerial personnel - staff with potential contacts to customers 	
4	<i>Shaping of contract</i>		II
	(specific to customers, yet legally secured)	<ul style="list-style-type: none"> - commercial department - lawyers 	
5	<i>Command of foreign languages</i>		II
	(apart from Russian, at least 1 foreign language)	- middle management level and upward	
6	<i>Ability to co-operate</i>		II
	(beyond the limits of the enterprise and, if needed, on a supranational basis)	- all staff	

With a view to the possible establishment of new enterprises in the form of joint ventures, the knowledge and experience to be necessary for management planning and management are missing in the countries concerned.

These capabilities will be needed very soon, which means that long training courses will not be very helpful. It is recommended to practise - subsequent to a course in fundamentals - "learning by doing", supported by international partners.

6.7.1.2 Modern management and working methods

For the development and translation of new work structures, amongst others management capabilities will be required which call for and promote modern working methods.

The presently prevailing, existing management styles, concentrating nearly exclusively on subject matters, do no longer comply with this requirement. What is called for now is a trusting management style, oriented at the same time and with the same intensity to the subject matter and to persons. This way the potential of the staff will best be encouraged.

First, however, the development of a new management style necessitates a critical examination of the old style, and a high measure of self-knowledge and realisation of one's shortcomings. This can only be achieved by a professional training management personnel.

In the periphery of this further capabilities will be required. These are mainly:

- organising (structures and processes);
- create wealth of information;
- delegate responsibility;
- solve conflicts professionally and actively;
- develop company identity;
- motivate other staff;
- appraise and select personnel objectively.

Modern working methods also require new capabilities and attitudes from the staff's side. These depend particularly on the abolishment of the rigid division of labour and the (hitherto unfamiliar) assignment of (partial) responsibilities.

These new capabilities and attitudes should concentrate on:

- ability for team work / ability to (be) criticise(d) in flexible structures, e.g. projects;
- thinking within an overall system (of the enterprise, or at least the department);

- ability to communicate (in a broader sense);
- consciousness of quality and quality management.

Various types of training are being offered internationally for the majority of these capabilities. Some of them, like the GRID[®] concept, offer the possibility for (further) training inside the enterprises themselves, performed by the enterprises' own staff who are holders of a respective trainer's licence. These trainers are trained in train-the-trainer seminars.

The extent to which personnel need to be trained or newly engaged can additionally be derived from the preconditions to be necessary for the best possible organisation of work.

The most important basis of modern principles of organisation is: flexibility.

To translate this flexibility means to be more open as regards the expansion of the resources inherent in the staff. This concerns particularly the working hours and the range of technical knowledge available among the ranks of the staff.

The background to all this is the attitude of each and any staff member, which cannot be trained. Most important here is to rouse their understanding by informing them about and explaining to them clearly the advantages the new working methods offer to the enterprise.

All this, together with the growing responsibility of each and any member of the staff, forms an essential human resource for the welfare of the enterprise.

6.7.1.3 Special (new) technical knowledge

With respect to the present tasks and processes of the railways it can be said that there are no serious deficiencies regarding the technical knowledge.

However, an expansion of knowledge and experience taken from the international market is essential for the enterprise's progress and its survival in international competition. So any chance for exchanging experience should extensively be taken advantage of.

There will be no real necessity to improve and expand the staff available unless new technologies will be introduced.

As regards production processes, statements to this effect were already made in chapter 2.

Additionally, it is indispensable to introduce modern data processing in the administrations of the railways and for the recommended new structures and enterprises.

The more comprehensive the individual data processing concept will be, the higher the effect from using the time resources thus set free, but the higher also will be the need to train staff in this sector.

For this purpose, a long-term, systematic training and further training of staff must be conceived which concentrates on getting to know the application programs, and where only select members of the staff will have to be trained in programming and administration.

6.7.2 Realised measures of human resources development

6.7.2.1 Management study tour

In order to familiarise representatives of the Armenian Railways, the Azerbaijan State Railways and the Georgian Railways with the knowledge and experience gained in modern transport, marketing, and sales strategies, to introduce them to the organisational, technical, and commercial conditions of railway transport and multi-modal transport in Europe, and to convey to them basics on the structure and effects of joint ventures, these representatives were invited to a Study Tour to Germany, which took place from 16 until 30 April, 1997. The participants were:

On the part of the **Armenian Railways (ARM)**:

- | | | |
|----|--------------------------------|---|
| 1 | Mr Asikyan, Rshtuni | Deputy of the Director General of ARM |
| 2 | Mr Torgomyan, Levon | Chief economist of ARM |
| 3 | Mr Mudaryan, Lyuksen | Deputy Head of the Gyumri loco depot |
| 4 | Mr Martirosyan, Ashot | Deputy Head of the Yerevan loco depot |
| 5 | Mrs Mkrtchyan, Ida | Accountant in the financial/economic office of ARM |
| 6 | Mr Hovhannisyan, Arshak | Director of the Yerevan signalling & telecommunication district |
| 7 | Mr Ivanyan, Garnik | Director of the Razdan power district |
| 8 | Mrs Gasoyan, Ofelia | Deputy Head of the locomotive department of ARM |
| 9 | Mr Kirakosyan, Artyush | Head of the wagon and passenger traffic of ARM |
| 10 | Mr Nazikyan, Zorik | Interpreter |

On the part of the **Azerbaijan State Railways (AGZD)**:

1	Mr Mekhtiev, Mekhti	Chief Engineer of AGZD
2	Mr Kuliev, Fizuli	Chief Engineer of the 'Railway Premises' administration of AGZD
3	Mr Sadygov, Ilal	Director of the Azrailwayexpedition
4	Mr Gassanov, Touran	Head of the 'Railway Premises' administration of AGZD
5	Mr Karnitzky, Oleg	Chief Engineer of the 'Signalling and Protection Technology' administration of AGZD
6	Mr Askerov, Vakhid	Deputy Head of the 'Goods Transport' administration of AGZD
7	Mr Aslanov, Khakim	Chief Engineer of the 'Traction' administration of AGZD
8	Mr Guliev, Mardan	Chief Engineer 'Power Supply' of AGZD
9	Mr Nazirov, Gurban	Chief Engineer of the 'Passenger Transport' production administration of AGZD
10	Mrs Maguerramova, Djeiran	Interpreter

On the part of the **Georgian Railways (GRZD)**:

1	Mr Melkadze, Igor	First Deputy of the Head, and Chief Engineer of GRZD
2	Mr Giorgadze, Ramaz	Deputy of the Minister for Transport of the Republic of Georgia
3	Mr Kiknadze, Mamuli	Technical Manager
4	Mr Thsivadze, Surab	Director of the Tbilisi factory of electric locomotives
5	Mr Tatishvili, Tengiz	Head of the international department of GRZD
6	Mr Rostomashvili, Nodar	Deputy Head of the international department of GRZD
7	Mr Gongladze, Ushangi	Deputy Head of the international department of GRZD
8	Mr Giorgadze, Jonde	Chief Design Engineer of the Tbilisi factory of electric locomotives
9	Mr Shelia, Vlademir	Specialist from the Ministry for Transport of the Republic of Georgia
10	Mrs Tsintsadze, Irene	Interpreter

The Study Tour was ruled by the following **thematic focal points**:

- 16-04-1997** **Arrival of the three delegations.**
- 17-04-1997 Talk on / discussion about railway structure and railway reform in Germany; "Bahn 2000 [Railways 2000]" concept
- 18-04-1997 (1) Introduction to structure and tasks of the remote control centre for railway and S-Bahn traffic at Berlin-Halensee:
– modern information systems for train spotting and control;
– technological procedures in train spotting;
– communication between central and loco driver;
– actions by the central in case of deviations from standard.
Visit to the remote control centre.
- (2) Talk, followed by a discussion, on the subject: "Possibilities and problems of establishing joint ventures in transport enterprises";
– legal bases of a joint venture,
– structure and effects of a joint venture enterprise,
– operational procedures,
– financing of a joint venture enterprise,
– marketing and customer winning,
– management of conflicts,
– joint venture in practice.
Visit to a German-Ukrainian joint venture enterprise working in transport, in the Berlin district of Friedrichshain.
- 21-04-1997 (1) Talk, followed by a discussion, on the subject "Passenger Transport of Deutsche Bahn AG [German Railways], Munich"
– customer winning and customer service in passenger transport;
– requirements to be met by modern passenger transport technologies;
– possibilities of customer information, and of an expanded service.
Visit to the Munich ICE (InterCityExpress) depot.
- (2) Visit to SIEMENS-Fernmeldetechnik [Telecommunications], Munich:
– presentation of modern train protection systems and communication systems for railway traffic.
- (3) Visit to SIEMENS-NIXDORF Informationssysteme AG, Munich:
– presentation of software systems for railways and forwarding agents.

- 22-04-1997 (1) Talk, followed by a discussion with representatives of 'Studien-gesellschaft kombinierter Verkehr', TRANSRAIL, and DB COM [Deutsche Bahn, Communication] on railbound goods transport (in Frankfurt/Main):
multimodal transport;
customer winning and service in goods transport;
requirements to be met by modern goods transport technologies;
possibilities of customer information, and of an expanded service, terminal policy of Deutsche Bahn AG.
- (2) Visit to a factory producing concrete sleepers, at Nuremberg:
demands on sleepers produced and quantities/makes ordered;
modern technologies in sleepers production;
modern fixing systems.
- 23-04-1997 Talks with representatives of the board of KRUPP GfT, Essen:
– presentation of track-laying and track maintenance technologies;
– discussion of possibilities for a co-operation in the Caucasus;
– requirements to be met by a joint venture in the Caucasus.
- 24-04-1997 Visit to Messrs. ADtranz at Hennigsdorf (by Berlin):
– presentation of modern electric locomotives and traction technology;
– discussion of possibilities for a co-operation of ADtranz with ARM, AGZD, and GRZD in the Caucasus;
– requirements to be met by a joint venture for the production and maintenance of electric locomotives in the Caucasus.
Factory tour (final assembly, test shop, car body shells, ICE shed).
- 25-04-1997 (1) Visit to Deutsche Waggonbau AG (DWA), Berlin:
– presentation of modern wagon technology for long distance goods transport and regional goods transport;
– discussion of possibilities for a co-operation of DWA with ARM, AGZD, and GRZD in the Caucasus;
– requirements to be met by a joint venture for the maintenance of wagons in the Caucasus.
- (2) Talk, followed by a discussion, on questions of business economics and organisation:
– organisation of the enterprise;
– organisation of work processes;
– motivation of staff;
– possibilities for staff to get higher qualifications.

- 28-04-1997
- (1) Talk, followed by a discussion, on the privatisation and splitting of German Railways (at DE-Consult, Berlin-Schönefeld)
 - (2) Visit to Messrs. FIEGE Logistik GmbH & Co. (at Brieselang, by Berlin):
 - structure/organisation and operating method of a logistics enterprise under conditions of market economy;
 - customer winning and service;
 - management of time and quality;
 - dealing with customers' claims;
 - co-operation with the railways, and with roadbound goods transporters;
 - possibilities of multimodal transport;
 - costs and tariffs policies;
 - pricing, contractual penalties, rebates.

30-04-1997 Departure of the three delegations.

In addition to the above programme and within the framework of the Study Tour, the TRACECA project group and selected representatives of the three Railway Administrations met to talk about the establishment of Joint Venture(s) (see separate Minutes of Meeting.). This meeting took place on 25 April 1997.

6.7.2.2 Training course GRID[®] - Management

6.7.2.2.1 Objectives of the training program GRID[®]

The GRID-Management training for the middle management at the AGZD, ARM and GRZD was to be directed towards

- identifying the personal style of management in contrast to others
- applying optimum team work
- getting to know different methods of problem solving
- giving and receiving constructive criticism
- familiarisation with methods of conflict solving and
- elaboration of approaches to optimum organisation development.

The training was to be evaluated, recommendations for further training measures and training comments were to be formulated.

Criteria for the selection of the GRID-Training

While analysing the actual situation at the AGZD, ARM and GRZD was found that there were deficiencies of effective management, leadership conduct and corporate culture. At the Soviet railways, management was based on orders and obedience, a principle still often inherent today. Typical for the situation is, that directions are for-

mulated without motivating the railway staff to actively follow these targets. On the other hand, featherbed-management was common at lower levels.

The system for management and organisation development „GRID“, created by the Americans Blake and Mouton, today is used all over the world and for the above mentioned situation it has the following advantages:

- the method - preparation by self-study, active group work, self-critical assessment of values and performance - allows a new approach while turning to market-oriented economy
- the management training is applicable for all management levels at the Caucasian Railways and does not depend on actual responsibilities.

6.7.2.2.2 Preparation of the training measure

Preparation of the instructor

In co-operation with the German „GRID“-Institute, the instructor made the necessary training documents available, translated the book: „Leadership Dilemmas - GRID solutions“ and the seminar paper in to Russian, worked out the programme for the training based on the GRID-Overall plan and prepared the lectures for the training sessions i.e.

- introduction to the GRID-Concept for organisation development
- Start - Process - Finish - Criticism, the importance of constructive criticism within team work
- The GRID-Concept
- conflicts and conflict solving
- conflicts and co-operation between teams
- development and perfection of organisation

Organisational preparation of the training

The administrations of AGZD, ARM and GRZD were asked to name 7-8 participants each for the GRID-training and to organise their preparation.

The decisions on personnel and organisation were made about four weeks before the start of training. The training itself was to take place at the Georgian Congress Centre Tabakhmela/Tbilisi. A lecture room, four additional rooms for group work and a room for the trainer-team were available.

23 participants were named and invited. Special care was taken to select personnel of the middle management in responsible positions and in charge of staff for different departments. Teaching and learning aids were explained in special introduction meetings in Baku, Tbilisi and Yerevan.

Preparation by the participants

The GRID-Training requires, that the participants work through different documents presented to them one month before the start of the seminar.

The activities of the training are based on this material. Being familiar with it, is a precondition for attending the course in view of the work load to be done during the training. The level of the preparing work was different and in some cases bad.

6.7.2.2.3 Implementation of the training measure

Preparation of the seminar

Before the seminar started, the participants were asked for the following:

- Assessment of the own management behaviour, of the actual and optimum corporate culture.
- Study of the book „Leadership Dilemma - GRID Solutions“ by Robert R. Blake/Anne Adams Mc Canse and the first part of course material.
- Test on the GRID-concept.

The training course

The separate sections were discussed in the plenary, the 6 lectures supplemented the know how on the GRID-Concept gained in the pre-training phase. The work within the four „Colour“-groups included individual study, solving a task in the team and finally giving up an assessment according to criteria such as decision finding, objective orientation, tendency/leadership, communications and constructive criticism.

The four „Colour“-groups worked out models on ideal teamwork which was later evaluated in newly formed groups. This created a competitive situation without however, leading to conflicts.

Again in a new group constellation a very complex and difficult task was to be solved. At the end of the course, in all groups the targeted synergistic effect should be perceived.

In the beginning of training there was a reluctance which partly resulted from the lack of preparation, but in the course of training the degree of active co-operation on the side of participants continuously improved. The course of the training in general was according to schedule.

Features of the conditions at the ARM, AGZD and GRZD

In the course of the training some aspects become obvious which are characteristic for the Caucasian conditions

- resulting from the overall political and economical situation of the Caucasian countries there is a general uncertainty on the further development. Many of the participants therefore doubt that it will be possible to realise new management styles in their practical work.
- The present schooling and training system neglects among others the transfer of know how through active self study. This affected the individual preparation. For the participants the learning methods used by GRID were new, especially the tests, evaluation forms and the modes of assessment.

6.7.2.2.4 Evaluation

Preparation of the participants

The documents and materials submitted to the participants in principle allowed a good preparation. The standards for assessing the qualification of staff in the exercises differ, however, from the standards which the participants would have applied. Most of the participants took part in the preparation day but some of them had not enough time for preparatory work.

Evaluation of the training by the participants

According to the evaluation form filled in by the participants, the course was assessed as follows:

- 19 of the participants found the GRID-Seminar to fully meet their objectives and expectations, four declared this in parts to be the case. All of the participants stated, that new and valuable information was conveyed in the course of the training.
- 15 of the participants could see a direct relation to their work
- Regarding to the learning experience the GRID-Questionnaire revealed that most of the participants could appreciate the training.
- Most of the participants believe that the training will have a positive impact on their management ability.

Nearly all of the participants declared the new information to meet their needs and wants in their organisation. The know how regarding various management styles was improved, a more critical attitude towards staff and one self promoted, and an implication of the GRID-Concept and its system of assessing other staff was transferred. The participants stated, that the team work and their assessment were very helpful in view of their future tasks and very efficient with regard to sophisticated problem and conflict solving, they received valuable impulses for improving their management style.

Evaluation of the results of the seminar

The GRID-Concept differentiates between 6 principle management styles:

- 9.9 Team management - highly objective and human related
- 9+9 Patriarchal leadership
- 9.1 Order-obedience-management - high at objectivity, low at human relations
- 5.5 Organisation management - medium at objectivity and human relations
- 1.9 Featherbed-Management - low at objectivity, high at human relations
- 1.1 Survival management - low at objectivity and human relations

Regarding to the value of leadership the following results were achieved:

		9.9	9+9	9.1	5.5	1.9	1.1
before/ pre	Training	40,9	33,9	28,1	32,2	29,1	15,8
	Standard	43,7	32,6	28,0	34,0	29,1	11,3
after/ post	Training	45,3	27,8	35,7	33,8	24,2	13,2
	Standard	51,3	32,3	28,7	31,9	25,7	9,2

The table clearly shows that the optimum leadership style 9.9 was valued lower than the international average before and after the training. This style was raised in value by 4,4 points.

Very positive are also the results regarding to the evaluation of the personal management style:

		9.9	9+9	9.1	5.5	1.9	1.1
before/ pre	Training	52,0	9,0	4,0	17,0	9,0	9,0
	Standard	65,9	12,0	4,2	12,6	4,0	0,7
after/ post	Training	39,0	0	39,0	13,0	9,0	0
	Standard	20,8	19,4	21,9	31,0	5,9	0,8

It becomes obvious, that the self-assessment of the personal management style regarding to 9.9 undergoes a change (52,0 to 39,0) which complies to the international trend. On the other hand, the value of style 9.1 increases from 4,0 to 39,0. This clearly shows, that in practice to the command management style is dominant. The training is a very effective way to develop performance and human related management styles and it has a broad range of application.

All in all it can be said, that the individual's performance and the group's performance could be increased well above average in the course of training.

In view of the most adequate organisation form an increase from 43,6 to 56,7 is visible (international rate 56,7), which reveals that the participants received valuable impulses for improving the organisation within the three railways.

Modes of evaluation

Most of the participants found the evaluation and test forms helpful for dealing with the various tasks forwarded to them.

The continuous and consequent application of the GRID-Method (case study/test - individual preparation - group work - analysis of the group's efficiency - open discussion of results) was regarded as very beneficial. The participants are of the opinion, that the discussions within the group work sessions were a major contribution towards achieving the training objective.

6.7.2.2.5 General comments

The participants were asked to evaluate the training and how they had experienced this week of learning. Most of them rated the course to have been excellent to very good.

Most of the participants would recommend the training without exception to head of departments, chief engineers and other staff having to communicate with people.

Asked about what they most liked about the training and what learning experience they had made, the following were named as key issues:

- Getting to know new management styles
- organisation of the training and the materials used for visualisation
- group work as teaching method
- comparing the personal management style to the GRID-Styles and deriving ways for personal improvement
- gaining a more critical attitude towards the own person/performance
- assessing more objectively the performance and overall behaviour of others.

6.7.3 Further recommendations

The evaluation of the measures already realised (see section 6.7.2) showed that the participants were very interested in these.

Especially the results from the GRID[®] seminar show that this management training method is very well suited for the Caucasian railways, and that it was additionally useful in that the close co-operation of staff from all three railways led to more acceptance, tolerance, and ability to co-operate.

It is therefore recommended to stick to the GRID[®] training concept and introduce it to the enterprises on a broader basis.

The more personnel are familiar with the GRID[®] experience, the more this will influence the quality of co-operation.

There are no rules as to the make-up of the participants of the individual seminars, i.e. staff from all fields and from all ranks of the hierarchy can be trained together, which is rather advantageous as regards the planning of the training.

With a view to the great number of personnel to be trained it is recommended to train suitable staff to be GRID[®] trainers. These could then gradually hold GRID[®] seminars for the personnel in their own companies instead of buying external experts for this purpose.

It is also recommended to go on, if possible, with making the best use of the international make-up of these seminars.

For future (further) training measures the capabilities of the first category mentioned in section 6.7.1.1 should have priority:

- marketing,
- cost accounting / controlling, and
- service.

They are the essential factors both for the railways and the new enterprises to successfully stand in competition.

A basic seminar of several days for the entire target group should in each case be the foundation from which to start.

Subsequently, special training taking their participants to more concrete problems of marketing and cost accounting / controlling are to be held for the respective specialists.

In the new enterprises, these special training can be replaced by "learning by doing", aided by experienced partners.

As regards further training contents, in particular: organisational principles, working methods, and customer relations it is suggested to apply a very practical training method instead of the customary seminar.

The reason for suggesting this method is that it is important that the staff's experience and preferences, grown out of culture, history, and educational background be transformed to a new quality. It cannot be the sole intention to learn everything anew, but to include one's own methods into an active process of effectivity analysis with a view to the new objectives, and then develop new and better ways on which to proceed.

Ideas from internationally gained experience are, of course, to be the backbone of the training. However, the behavioural changes to be necessary (like working methods, relations to customer, and so on) will primarily be based on insight and not on the knowledge of methods that guarantee success elsewhere.

Thus, any method will be suited that implies active group learning of several days or active group discussions like, for instance, the workshop method presently very popular in Germany.

An additional advantage of this use of methods would be that personnel will get to know a very effective method to solve routine problems in their work; something that, though requiring only little training, will be of permanent use to them.